- Bowaters No. 3 newsprint machine
- Impact of packaging on the paper industry
- Five-year plan to insure technical manpower supply
- Tree farming and forest economics

The Paper Industry

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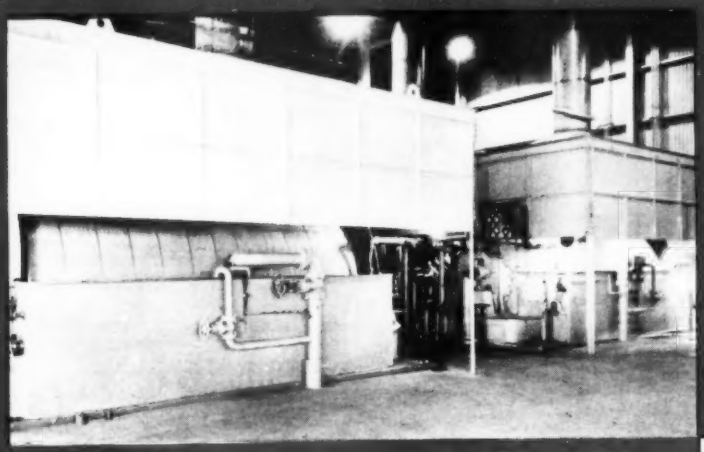

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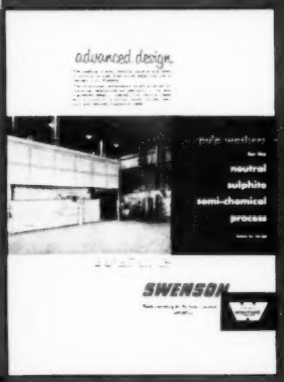

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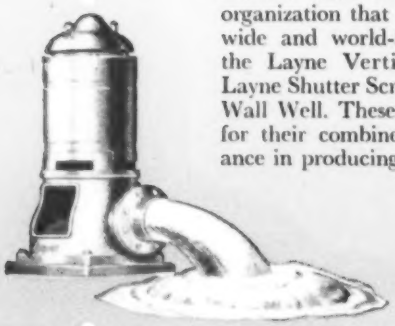

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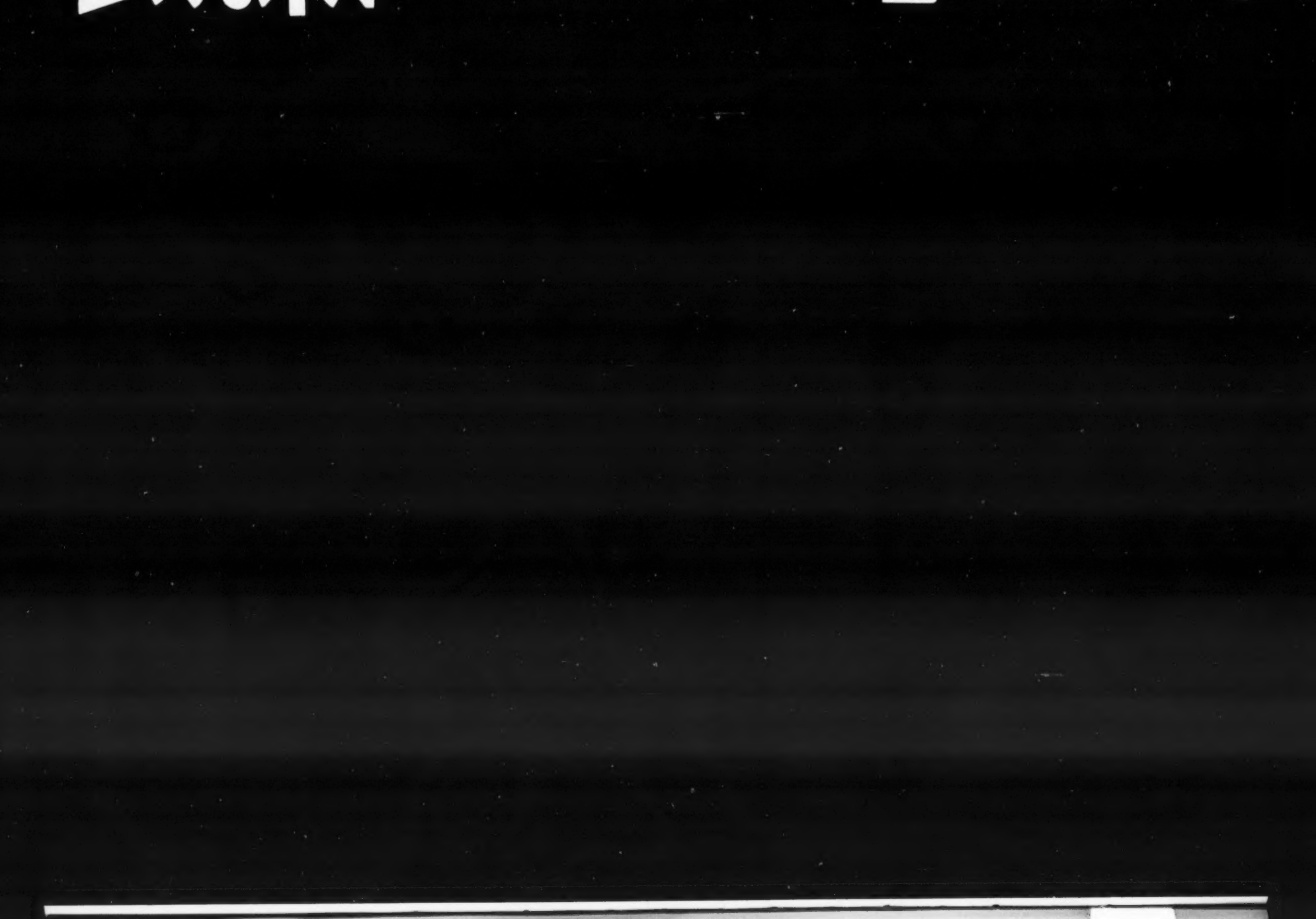

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If your operation involves any corrosive element, it will pay you to get this new booklet on Ryertex-Omicron PVC . . . and investigate the 20-year record of the plastic that won't corrode, rot or "age." Here's what the booklet includes:

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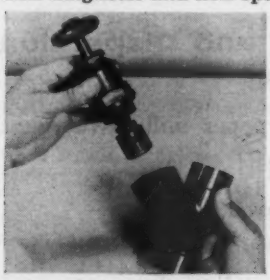

Injection molded globe valve of Ryertex-Omicron PVC. The same smooth finish on the inside assures maximum flow.

Typical applications—The ability of Ryertex-Omicron PVC to withstand temperatures of 165° F. in continuous service make it suitable for many applications previously barred to plastics. Moreover, it can be formed and welded as readily as metal. In paper mills, Ryertex-Omicron PVC is recommended for: Pulp lines, chlorine lines, chlorine gas distributors, white water tanks, sizing tanks, head boxes, troughs, flow boxes and baffles, blowers, heater linings, fan housings, wet side bars and girths, trays and pulp measuring devices—to name just a few of many applications.

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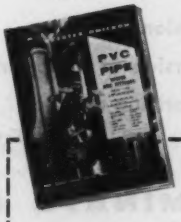

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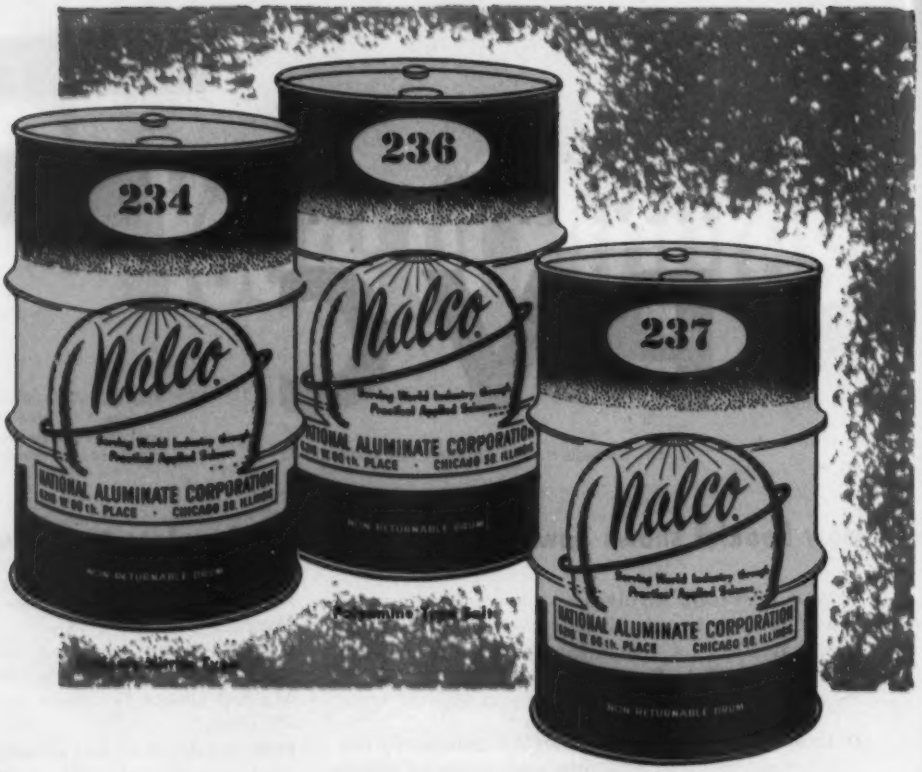

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From our point of view . .

A growing wood supply for a continuously expanding market

The 37th General Conference of the Pacific Northwest Trade Association, held in Portland on April 14-16, focused attention on our forest resources and on the extensive forest management methods now being adopted by wood-using industries and private owners of woodlands.

It has taken quite a concerted educational effort to convince a reluctant public that a forest does respond to management practices, and that it is there to be harvested at some optimum stage of development, in very much the same fashion as any other agricultural crop. A completely new attitude has developed from the discovery that there is very little new growth in an old forest, and that only the rapid, vigorous growth of a young forest adds a new and substantial wood supply to our timber resources.

With this realization, new horizons of expanding opportunities immediately presented themselves. Forest economists began to think in terms of bringing new growth and logging operations into balance, instead of emphasizing and adhering to the old theory of preserving the virgin forest lands. "The tree", as pointed out in a paper by Bernard L. Orell (published in this issue), "has become a liquid asset. It is salable. It now pays to invest capital in trees at all stages of their normal life."

Experimental results now show that the rate of forest growth can be increased substantially by the application of fertilizer, especially nitrogen-containing fertilizer. Geneticists are now trying to develop disease-resistant and fast-growing strains by a process of selection and cross pollination of trees showing these characteristics.

All this is done with the conviction that there will be a continuously expanding market for the products derived from our forest resources. According to American Forest Products Industries, our current annual per capita consumption of wood amounts to 78 cu. ft., which is used in the form of some 5159 different articles.

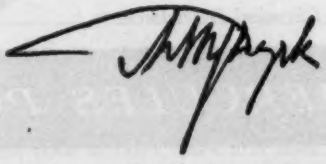
What about the future markets? Scientists everywhere persist in the development of metal and plastic substitutes for wood. Some even foresee the possibility and advocate the desirability of manufacturing paper from materials other than cellulose fiber.

This, however, should not give us any cause for alarm or pessimism. Other scientists are working with equal determination in the direction of keeping currently used wood products competitive for many years, while new products derived from wood are constantly appearing on the market. It is indeed difficult to see how the full potentialities of our self-renewable forest resources could ever again be underestimated.

Even in the event that, in some distant future, the forest products industry should have to yield on competitive grounds to more economically manufactured metal, plastic or mineral substitutes for wood articles and paper products, this could only lead to an upgrading of our forest resources as a raw materials source.

A reasonable prediction is that our forests are destined to supply the raw materials for a new and thriving organic chemicals industry. Eventually we may even have to depend on the forests for a substantial quantity of our food supplies by converting the cellulose into sugars, starches and even proteins.

No matter, therefore, how we look at it and what the developments will be, the future for the forest products industry seems extremely bright.



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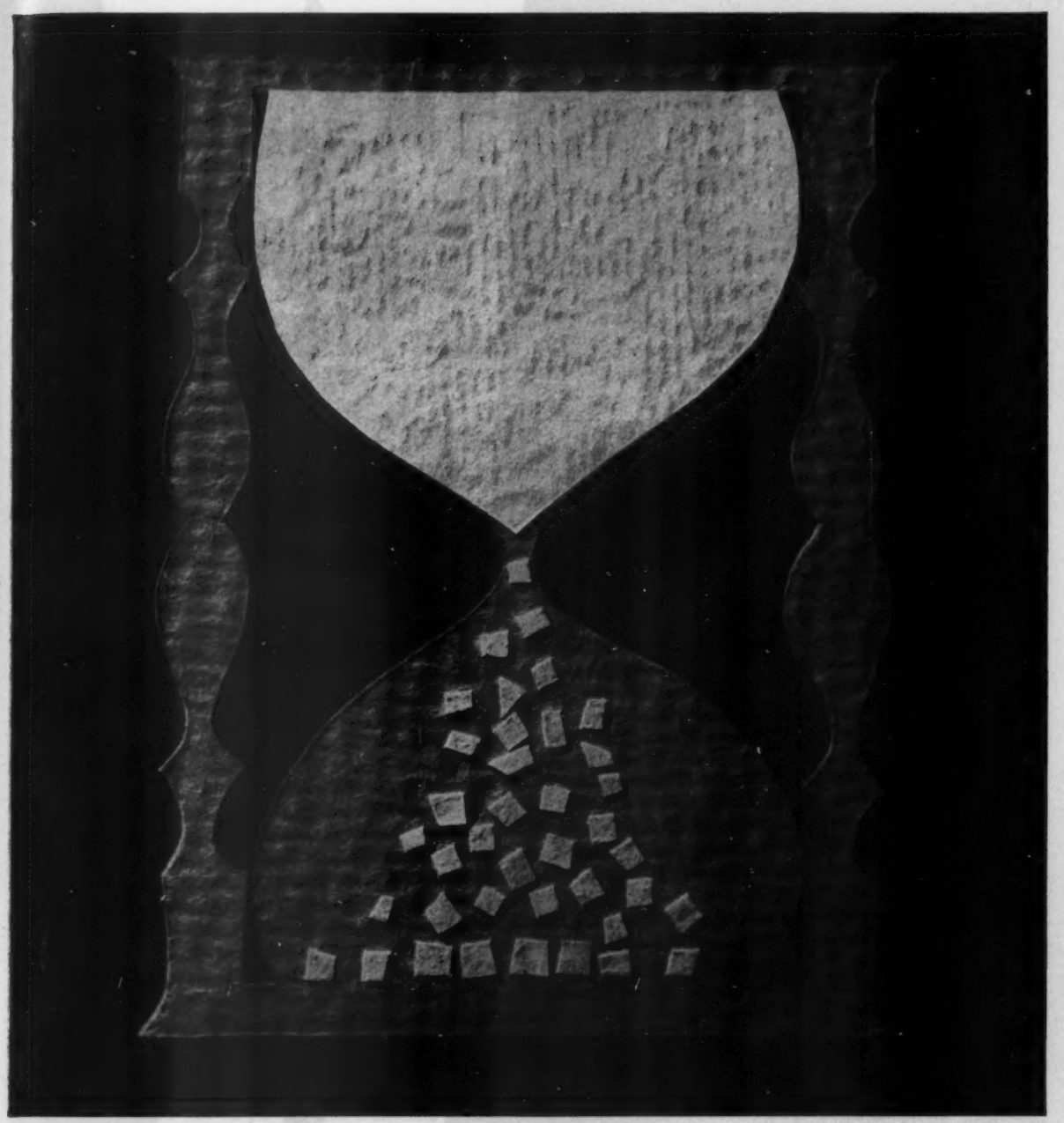

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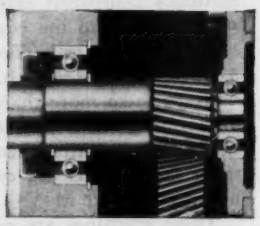

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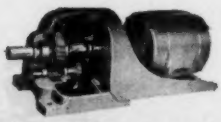

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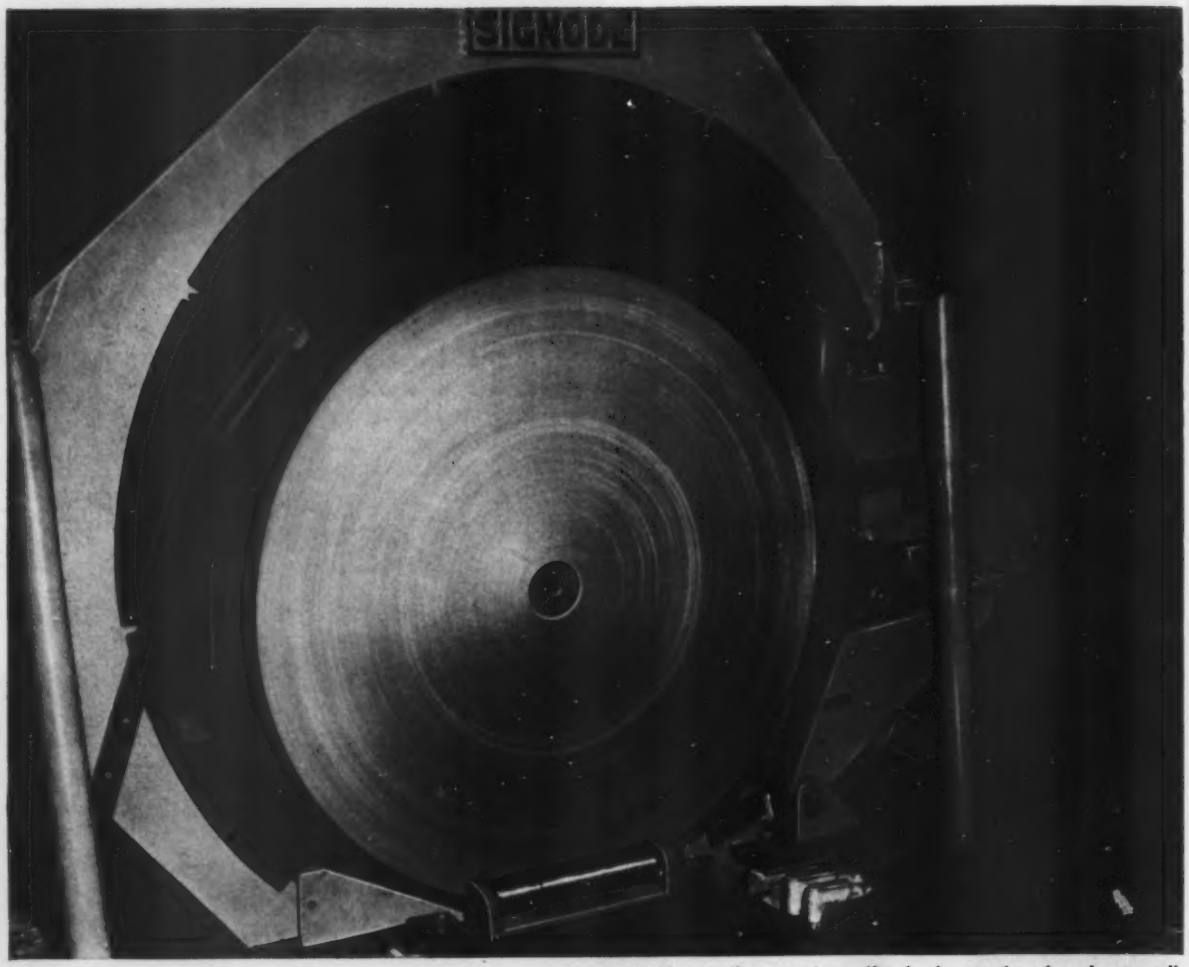

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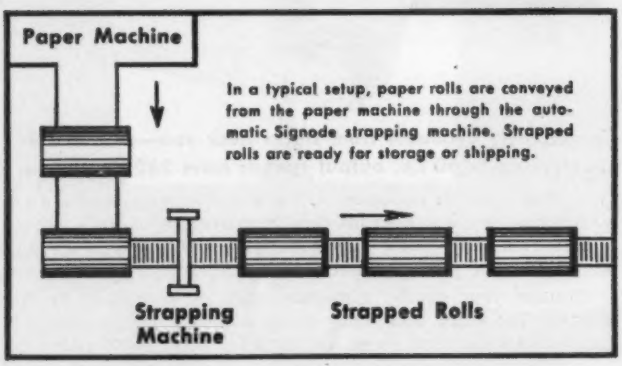
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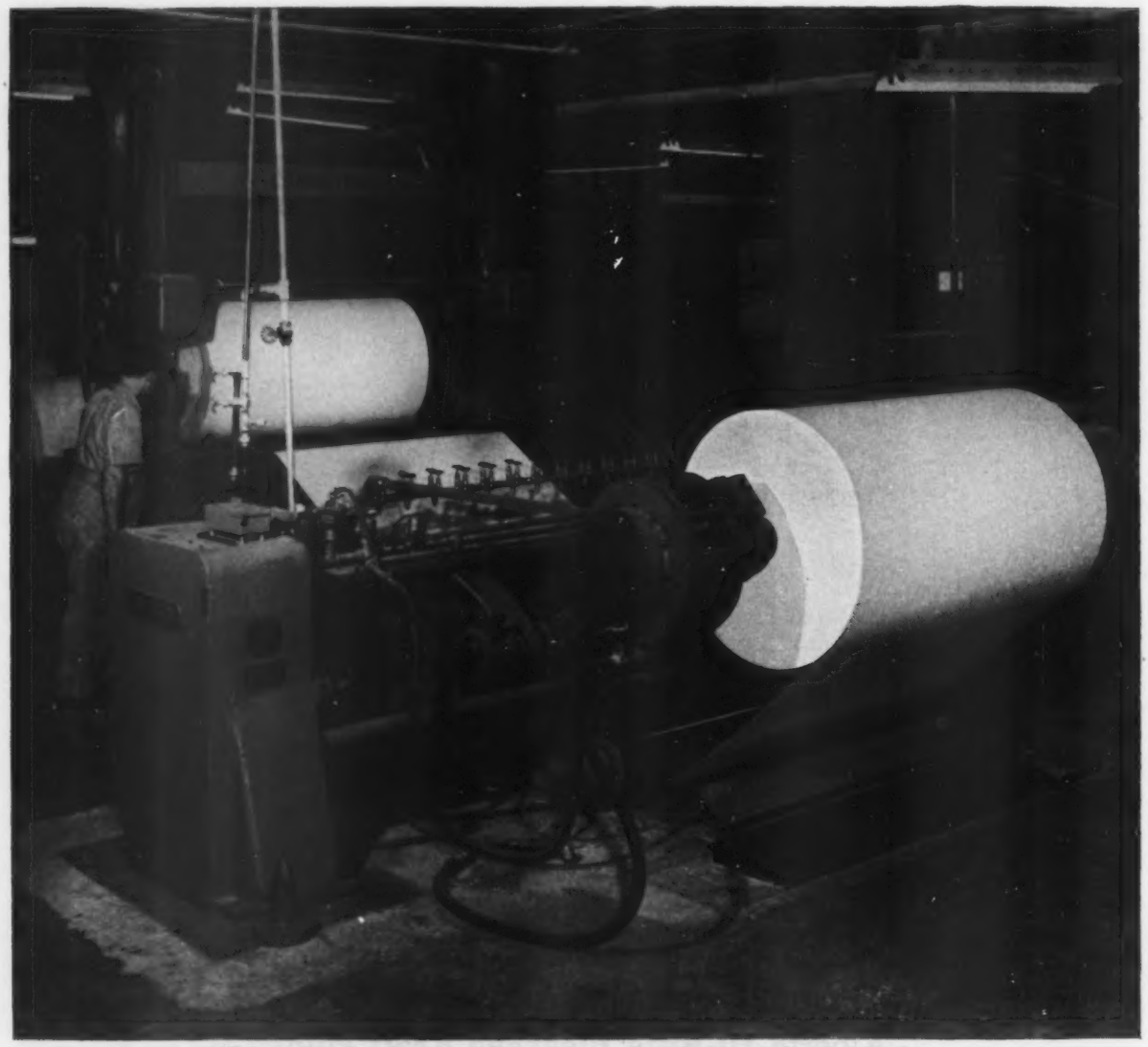
and forming properties—
Alberta Hi-Brite Bleached Kraft Pulp.
Now in production.

KRAFT DIVISION
St.Regis PAPER COMPANY
150 EAST 42ND STREET, NEW YORK 17, N. Y.



Efficiency in action. Paper unwinds from Langston Single Position Shaftless Roll Stand in foreground; passes under stand; is slit and rewound on Langston Slitter & Winder Type "BA."

Langston Winder & Shaftless Stand

save paper cup company $9000 a year

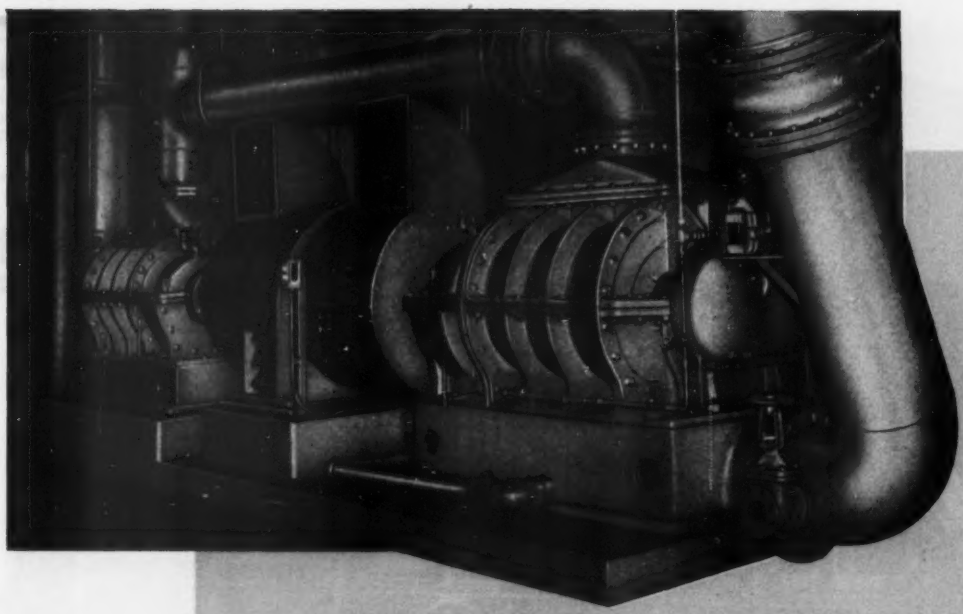
To make paper cups and lids, Dixie Cup Co. starts with an efficient combination of Langston machines.

Paper stock in rolls 72 in. wide and weighing upwards of 2 tons are picked up from the floor conveyor by the Langston Type "BA" Shaftless Roll Stand and fed into the winder. This completely power-operated stand, equipped with constant tension brakes, is operated by one man. It ends forever the time and drudgery of old-fashioned roll shafting and the need for an overhead crane. Savings add up to $9000 annually.

The Langston Type "BA" Slitter & Winder runs at a speed of 1750 feet per minute—500 fpm faster than the former installation. Shear-cut Langston slitters make such clean edges that later trimming is eliminated. This feature, plus the automatic tension control provided by the Langston Roll Stand, has helped cut paper waste at Dixie Cup by 50%. Clean cutting also keeps the plant cleaner by holding paper dust to a minimum.

Langston Slitters & Winders are available in sizes up to 196 in. wide and in speed ratings to 3500 fpm and beyond. Shaftless roll stands can be ordered to match. If you aren't enjoying the greater efficiency these machines make possible, write for full details. SAMUEL M. LANGSTON CO., 6th & Jefferson Sts., Camden 4, N.J.

LANGSTON *Leadership...by design*



For the world's largest Yankee tissue machine...

R-C Vacuum Pumps keep production rolling at 3000 fpm

At Crown Zellerbach Corporation's St. Helens mill in Oregon, the world's largest Yankee tissue machine, with a 258-inch wire, is producing 100 to 120 tons per day at a speed of 3000 fpm.

To provide the required vacuum for the pressure roll, suction wire boxes, wringer roll, suction couch, pickup and felt conditioners, there are seven Roots-Connersville vacuum pumps to supply approximately 33,000 cfm of air at 10 to 20" Hg vacuum.

Five important operating factors have proved the performance of these R-C Positive Displacement Vacuum Pumps:

- ***Reduced horsepower at higher speeds*** **(600 rpm and up) creates power savings up to 25% and far lower first cost of motors.**
- ***Single-stage or two-stage units*** **in capacities for all requirements.**
- ***Proved reliability and low maintenance*** **with no internal contacts or excessive wear and freedom from down-time and maintenance.**
- ***Minimum sealing water*** **from 4 to 40 gpm, unaffected by water temperature.**
- ***Small floor space*** **with less expensive foundations and lower cost per cubic foot of capacity.**

R-C Positive Displacement Vacuum Pumps purchased for this installation

- Two 16 x 40" single-stage pumps
- One 14 x 35 single-stage pump
- Two 20 x 40 x 20 x 16 two-stage pumps

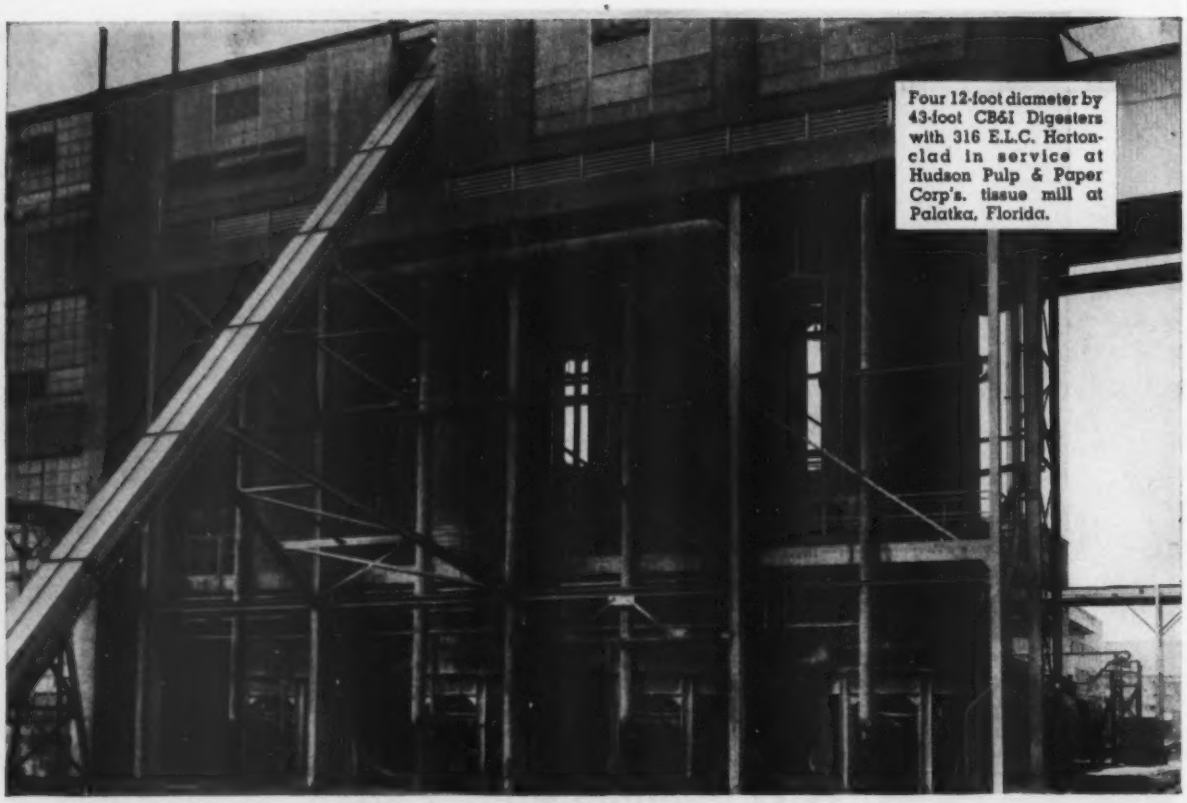
The 14 x 35 single-stage unit is direct-connected to a special shaft extension from one of the 16 x 40 units to make a two-stage compound pump.

For evidence of how other leading industrial users benefit from these advantages, write for Bulletin 50-B-13.

ROOTS-CONNERSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES, INC.

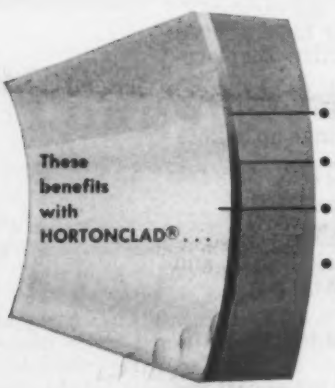
557 Walker Ave., Connersville, Indiana. In Canada—629 Adelaide St., W., Toronto, Ont.



Four 12-foot diameter by 43-foot CB&I Digesters with 316 E.L.C. Hortonclad in service at Hudson Pulp & Paper Corp's. tissue mill at Palatka, Florida.

HORTONCLAD®

better corrosion protection for clad vessels with high vacuum brazing process


These benefits with HORTONCLAD® . . .
• UNIFORM THICKNESS
• HIGH STRENGTH BOND
• CLEAN, CONTAMINANT-FREE SURFACE
• ADAPTABILITY TO ANY SIZE OR SHAPE

Hortonclad, available only in CB&I tanks, pressure vessels and other clad structures, is unlike other clad materials. The bond is accomplished by a flux-free high vacuum brazing process producing a clad plate with an integral and continuous bond of high strength. Uniform clad thickness results as both alloy cladding and backing are in their final thickness *before* bonding. Silver, stainless steels (both chromium and chromium nickel) nickel, and high nickel alloys such as Monel, Inconel, and Hastelloys B and F can be employed in the Hortonclad process.

In corrosive service, Hortonclad permits the use of higher temperatures, concentration and pressures —without the high cost of solid alloy vessels. For further information on its application, write our nearest office . . . ask for the *Hortonclad* bulletin.

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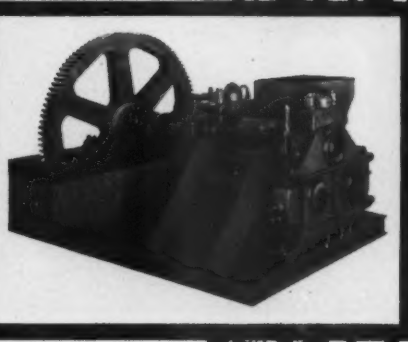
PP-20

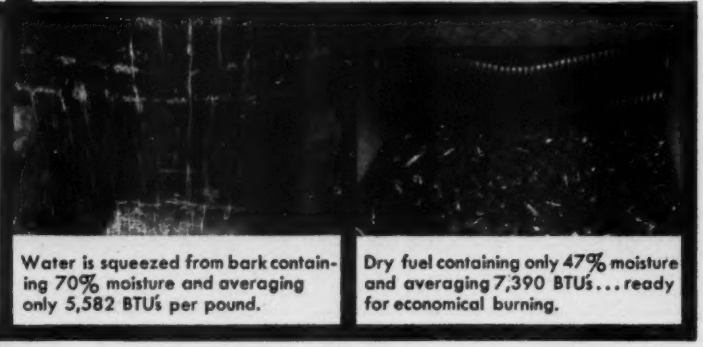
solve your burning question!

MAKE PROFITABLE FUEL FROM WET BARK

WITH A **FULTON ROLL PRESS**

The photographs show how a Fulton Roll Press de-waters and reduces mill refuse into efficient fuel... ALL IN ONE CONTINUOUS OPERATION.





Water is squeezed from bark containing 70% moisture and averaging only 5,582 BTU's per pound.

Dry fuel containing only 47% moisture and averaging 7,390 BTU's... ready for economical burning.

FEED WASTE INTO THE HOPPER
WATCH DRY FUEL POUR OUT

The Fulton Roll Press will rid your plant of soggy bark, knots, screenings and other fibrous material. And this process costs far less than inefficient "batch" methods.

It took FULTON... with over 104 years experience in dehydrating fibrous material for the sugar industry... to develop the remarkable Roll Press.

MAKE US PROVE IT ON YOUR MATERIAL...

... Mail coupon now for full details and FREE TEST RUN of materials you want to process.

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Please send full details of FULTON ROLL PRESS.

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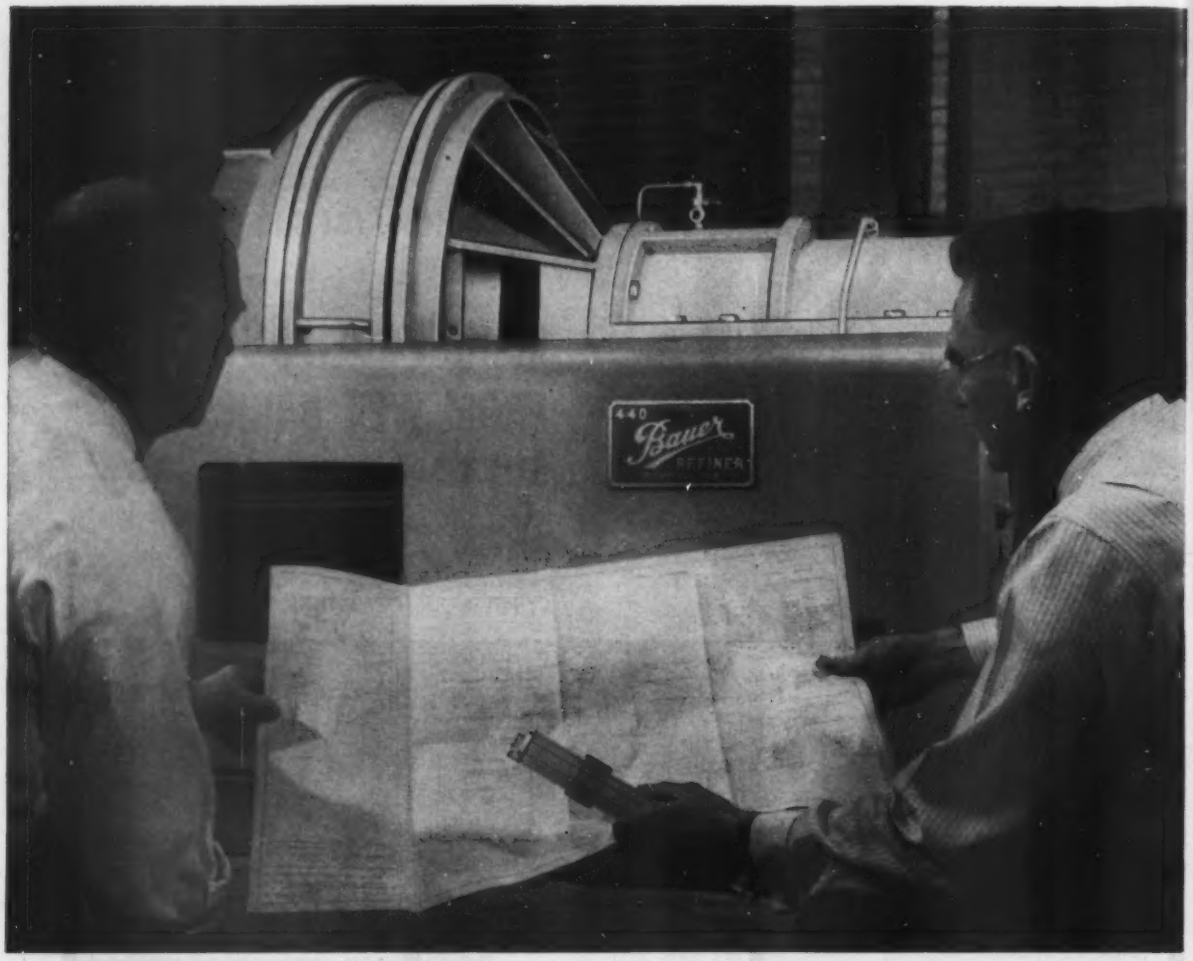

Bauer Pump-Through Refiner Improves Quality and Lowers Costs...

HELPS MILL WIN BATTLE OF SURVIVAL

Our report No. 1056 explains how this refiner kept a mill in competition after a forced change to a new raw material caused serious production problems. Formerly using easy-beating straw in the manufacture of nine point corrugating medium, the mill switched to waste paper and found their jordans inadequate for the new refining requirements. A Bauer Pump-Through Refiner, installed after the jordans, improved end product quality at reduced costs and helped keep this mill in business.

The Bauer Pump-Through Refiner does an outstanding job of fiber separation, hydration and freeness control in stock preparation. It produces uniform, reproducible quality sheet with high mullen and tear values. Efficiency, low horsepower requirements and rugged design mean big savings in operating costs, labor and maintenance.

These modern refiners can supplement your present jordan capacity or replace jordans completely. Available in two sizes, they are used in producing liner board, bag paper, corrugating medium, cotton linter products, fine papers, tissues, newsprint and in other semi-chemical and kraft applications. Automatic controls and a wide variety of plates tailor-fit them to your needs.

May we show you complete details?

The Bauer Bros. Co.
DISC REFINER HEADQUARTERS

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1759 Sheridan Ave., Springfield, Ohio

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From *Furnish* to *Finish*,

Versatile *Ethylex* Gums improve your paper

Higher concentrations now possible due to reduced setback and superior flow properties of these remarkable gums. Whether used as wet-end additives, for surface sizing or machine coating—Ethylex Gums will improve the character of your product.

Especially suited to addition in your furnish, Ethylex Gums afford better bonding of fibers throughout the web. Yield sheets with greater mullen and tensile strength.

And excellent film-forming properties also improve strength as well as surface characteristics. Increased sizing efficiency permits reduction of total added weight of size or in quality of base stock. *Either way, Ethylex Gums save you money.*

Superior water retention and reduced setback result in clear, flexible films. Ethylex Gums thus provide colors with exceptional leveling properties—promote uniform distribution—minimize penetration into body stock. *The result—sheets with high pick-test values and better printability.*

To discover how Ethylex Gums can increase your machine speeds—improve the character of your products—yes, and actually save you money—see your Staley Representative or write for Staley's new brochure on Ethylex Gums.

Informative Brochure tells properties and wide range of applications of Ethylex Gums. Send for it today. No obligation.

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the Modern Low Density Bleaching Technique

Impco
"Pump Thru" Tower

Operating results with this new tower design prove the Impco theory of external chemical mixing and separate internal circulation. By eliminating the top scraper and expensive launder construction, air-free pulp now goes directly to the washer, resulting in increased washing efficiency. With the emphasis on pulp quality, external mixing permits representative pulp sampling.

A single pump with minimum equipment simplifies this difficult job of chemical bleaching.

IMPCO®

IMPROVED MACHINERY INC.

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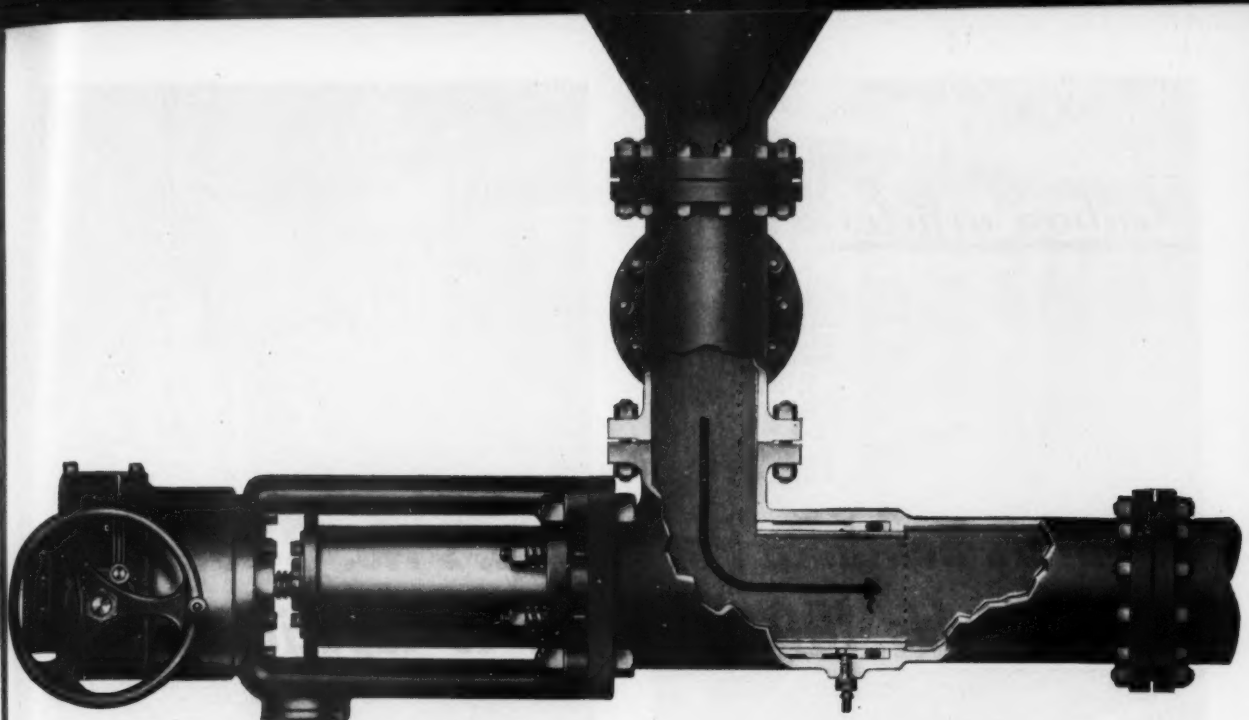


full, free digester discharge

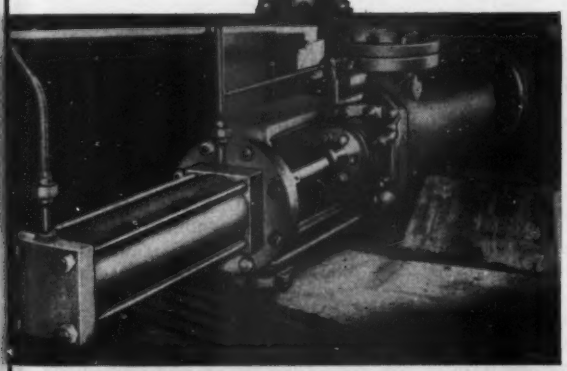
Digesters blow fast and clean with YARWAY Seatless Blow Valves.

The hollow sliding plunger has no pockets where wood chips or tramp materials can hang up.

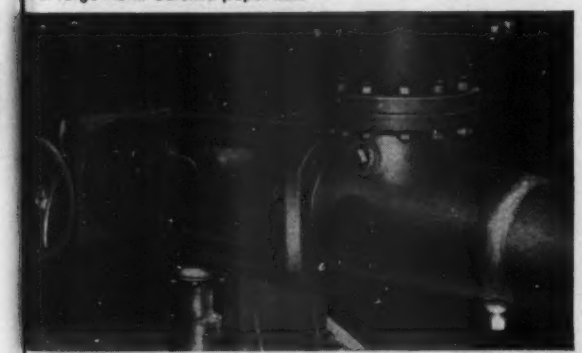
All Yarway Digester Valves have full pipe area, permitting fast discharge with minimum pressure drop. Comparisons show greater discharge area—reducing blowing time, increasing number of cooks.

Scores of pulp mills report *lower operating costs* and *increased production* due to YARWAY Digester Blow Valves. One large mill found *savings in operation and maintenance the first year more than paid the cost of their 4 new Digester Valves!*

YARWAY Seatless Digester Valves can be furnished either with electric motor or hydraulic cylinder units. Both are remote controlled. Bulletin B-441 gives the whole story. Write for it.



RAULIC-OPERATED Yarway Digester Blow Valve—one of six in-d at large North Carolina paper mill.



TOR-OPERATED Yarway Digester Blow Valve—one of eight installed rge Canadian paper mill.

YARNALL-WARING COMPANY

149 Mermaid Avenue, Philadelphia 19, Pa.

BRANCH OFFICES IN PRINCIPAL CITIES

·· DIGESTER BLOW VALVES

Feature articles

Bowaters Southern Paper Corp.'s No. 3 newsprint machine adds 100,000 tons to capacity

A. W. J. DYCK

▶ Among the highlights of Bowaters' latest expansion are the 6000-hp motors on the grinders, the single 1750-hp drive arrangement of eight vacuum pumps and the forced-vapor circulation of heat control and condensate removal in the dryer section.

BOWATERS' THIRD NEWSPRINT machine, which went into operation at the beginning of this year, will boost the company's newsprint capacity to 300,000 tons, an increase of 100,000 tons over the 1956 capacity.

The $30,000,000 expansion program, marked by the installation of No. 3 machine, is already being followed by another $26,000,000 program, which will add No. 4 newsprint machine (a duplicate of No. 3) to the existing facilities. By the end of 1958 Bowaters Southern Paper Corp.'s newsprint production capacity will total some 400,000 tons and make this mill one of the largest of its kind in the world.

Bowaters Southern Paper Corp. is a subsidiary of the Bowater Corp. of North America Ltd. of Montreal, which in turn is a subsidiary of the Bowater Paper Corp. Ltd. of London, England. For years the company has had the reputation of being the world's leading manufacturer of newsprint. In the last two years Bowaters Southern Paper has won, lost and regained the speed record in newsprint production. The completion of No. 3 machine, with its many improvements in design and operation, will contribute greatly to the company's ability to retain the speed record for many years.

Another development that will provide Bowaters Southern with an added advantage is the location at Calhoun, Tenn., of Bowaters Research & Development Inc. This new company will coordinate development and production for the entire Bowater organization in the United States and Canada.

Pulpwood handling

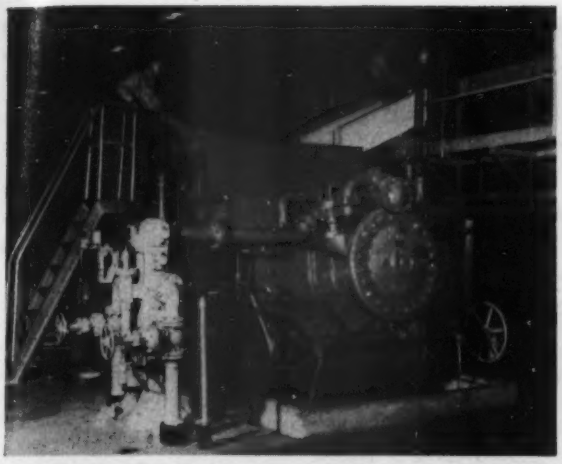
With the third machine in operation, consumption of pine pulpwood has increased from 1200 to about 1400 cords per day. This increased consumption of pulpwood made it necessary to add a new three-section, 12-ft. diameter by 67.5-ft. long Weldrum barker. The

W. J. Sutton
Mill Manager

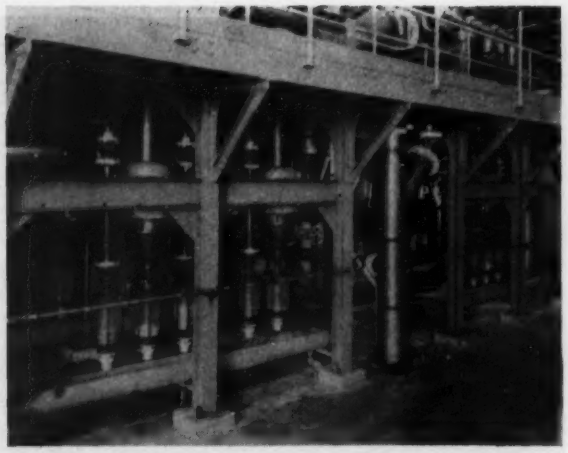
C. E. Opdyke
Compt. and Treas.

D. W. Timmis
Secretary

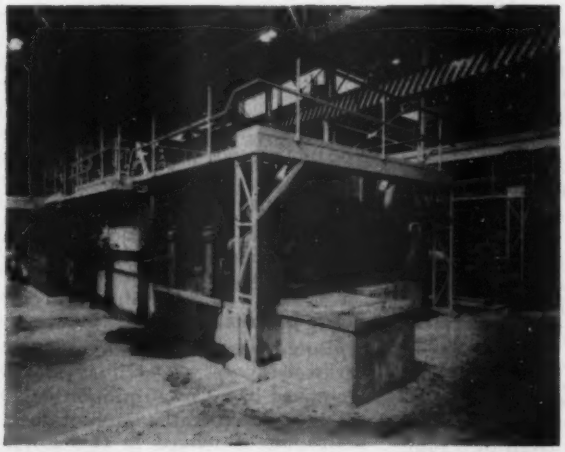
R. R. Edgar
Woods Manager



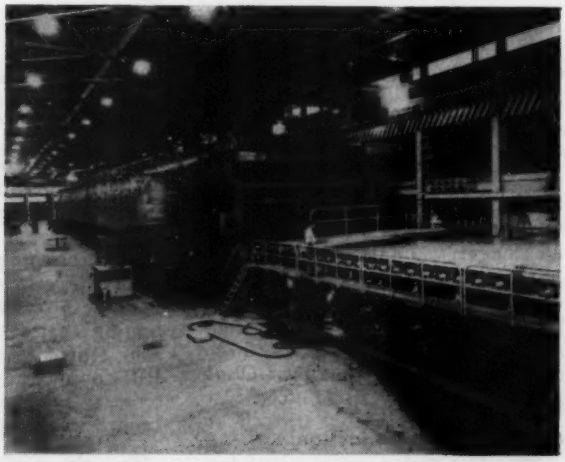
View of the 67-ton/day capacity Great Northern Waterous grinders that are driven by 6000-hp motors.



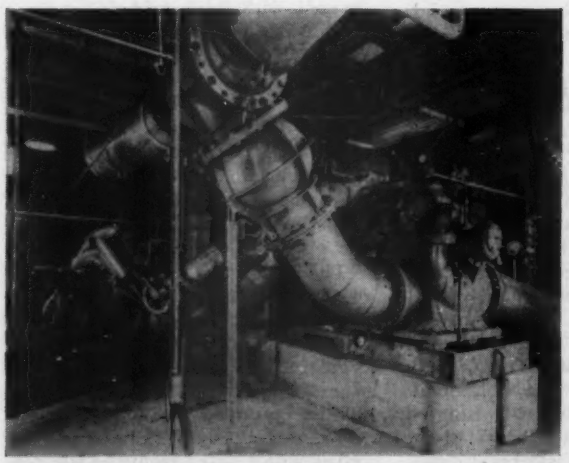
View of the battery of Dirtec units supplied by Bird Machine Co.; there are 12 king and regular size units.



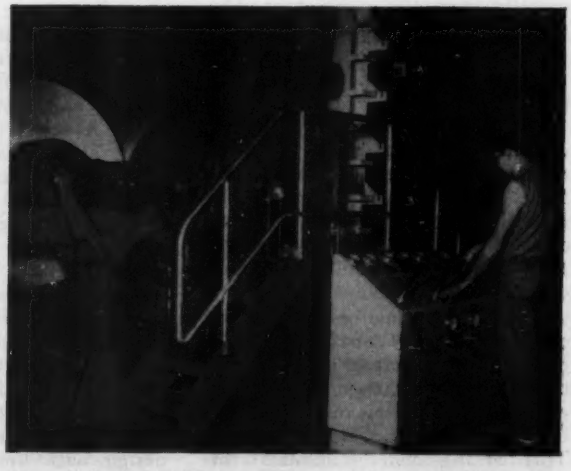
View of the six Bird Machine Co. 3A screens preceding the paper machine.



The new Beloit Iron Works 276-in., 2500-fpm newsprint machine.



Two Ingersoll-Rand 23,000-gpm fan pumps—one serving the Bird screens and the other the Beloit headbox.



View of the Beloit 48-in. constant-speed drum reel following the Beloit open-side type eight-roll calender stack.

Eight (i.e., five H-12A and three K-10A) of the 11 Nash Hytor vacuum pumps are driven by a single 1750-hp Electric Machinery Mfg. Co. motor.

new Weldrum barker consists of three separate stave type sections 22½ ft. long. Each section is equipped with two tires and one gear driven by a common drive shaft. The opening in the heads of the drum has been increased to handle longer wood lengths.

A 21-in. debarker supplies an additional 50 cords per day of barked hardwood for the hardwood semi-chemical pulp pilot plant, which operates on a rapid cycle system using a 175-cu. ft. digester.

Groundwood production

The installation of six grinders of improved design and each having a capacity to produce 67 tons of groundwood pulp per day increases the mill's daily groundwood pulp capacity from 400 to 800 tons. The grinders are equipped with load governors, master governor and pumping plant for the hydraulic pressure needed.

Each of the new grinders is driven by a 6000-hp synchronous motor at 247 rpm. These are the largest motors ever used to drive individual grinders. By contrast, each of the eight grinders on Nos. 1 and 2 machines is driven by a 4500-hp motor.

The 6000-hp motors are totally enclosed, self-ventilated and equipped with bottom-mounted air-to-water heat exchangers. The coolers are sealed in a pit through which the ventilating air is recirculated. This arrangement minimizes the ventilating requirements of the grinder motor room and reduces corrosion and deposits of foreign material in the motors. The motor design incorporates a high torsional-strength rotor, high capacity cage winding and large sleeve-type bearing with two-oil ring lubrication to insure cool running and dependable service.

The groundwood pulp coming from the grinders is first screened in three 5-ft. by 14-ft. low-head vibrating coarse screens, followed by four (three Mark A and one Mark E) Cowan screens. The Mark A screens, equipped with aluminum bronze plates perforated .065-.075 in. in diameter, are driven by 75-hp motors. The Mark E screen, equipped with aluminum bronze plates perforated .050-.060 in. in diameter, is driven by a 60-hp motor. The rotor and dilution water pipe assembly of these screens are rubber-covered and rubber-lined. Cast iron interior parts are protected from corrosion and erosion by factory applied phenolic coating and synthetic rubber. Each Mark A screen is capable of handling approximately 180 ADT/24 hrs. of newsgrade groundwood at approximately ½ hp per ton of screened pulp per day.

The screened accepted stock is collected in the screened stock tile chest. The groundwood chest, which has a capacity of approximately 4500 cu. ft. of 3.5 per cent consistency groundwood, is equipped with a 60-in. all-bronze horizontal propeller agitator, of the single-cluster and four-blade steel shaft design with bronze sleeves.

From the groundwood chest stock is pumped to 12 king and regular size Dirtec units. It is then thickened in six 8-ft. diameter by 16-ft. vacuum filters and stored in a tiled decker chest equipped with agitator. The decker chest agitator is Lastiglas-coated and features stainless steel sleeves at guide bearings.

Additional refining equipment includes two 36-in. single-disc refiners with drainers.

Stock preparation

Groundwood, bleached kraft and hardwood pulps, as well as broke, are mixed by a Cowan proportioner. Prior to entering the proportioner, kraft pulp is refined in two Royal jordans. These jordans incorporate the "Accru-Set" mechanism with amp sensitive control panel for automatic plug positioning. The internal surfaces of the jordans are covered with hard rubber.

The broke is first thickened in a 11.5-ft. diameter by 20-ft. saveall and then refined in a jordan, prior to entering the proportioner.

The levels of the various pulp stocks in the proportioner are controlled by liquid level controls, while the actual flow of the stock from the proportioner is determined by the orifice openings.

The mixed stock is then pumped to the machine chest. From the machine chest it is pumped at 4.3-per cent consistency to a consistency regulator and then to the stuff box, where color is added by a meter. It is then pumped by a 23,000-gpm 575-rpm fan pump (which also receives white water from the tile collector chest) to six 3A screens. The screen fan pump is driven by a 150-

hp synchronous motor of drip-proof construction. The screened stock is then collected in a deaerating flume. From here it is pumped by another 23,000-gpm, 575-rpm fan pump driven by a 200-hp synchronous motor through an air motor-operated steam flow valve to the headbox of the paper machine.

Fourdrinier and press sections

No. 3 machine is a 276-in. fourdrinier designed to operate at speeds of 2500 fpm. Stock enters the air-cushion inlet of the headbox through a motor-operated streamflow valve. Constant level is maintained in the headbox by air pressure supplied by a Hytor compressor. The approach flow to the slice is controlled by self-cleaning rectifier rolls of latest design.

The fourdrinier carries a wire 276 in. wide and 130 ft. long. It is further equipped with a 38-in. diameter bronze breast roll, a stainless steel forming board, 23 grooved and plain table rolls of 14-in. diameter each, stainless steel deflectors, six stainless steel suction boxes equipped with the latest design oscillating equipment, a 44-in. diameter suction couch roll featuring the latest patented drilling pattern and silencer to reduce noise level, a 38-in. diameter wire turning roll and two additional drive rolls. The return wire run further features a patented air diaphragm wire guide and the latest design wire tension indicator device and oscillating wire roll doctors.

The fourdrinier is removable for rapid wire changing, and all exposed frame work is protected from corrosion by stainless steel covering.

Stainless steel savealls, which discharge white water to the tile collector chest, extend from the breast roll to the suction couch roll.

The press section consists of a 32-in. diameter suction pick-up roll, a suction transfer press and two straight-through presses. The suction rolls are made of centrifugally cast brass and are equipped with air-loaded packing and stainless steel savealls.

The suction transfer press has a 42-in. diameter bottom suction roll and a 36-in. diameter rubber-covered top roll. The second and third presses have 44-in. diameter rubber-covered bottom suction rolls and 42-in. diameter granite top rolls. Nip pressure between top and bottom rolls is applied and regulated by an air-loading arrangement.

A conveyor on the second press delivers broke to a tile broke chest.

The pick-up felt is equipped with a 32-in. diameter suction wringer roll and a 36-in. rubber-covered roll.

The vacuum system

The vacuum for the flat suction boxes, the couch and suction rolls is provided by five H-12A, three K-10A, one H-9 and two K-7 Hytor vacuum pumps. The arrangement of the pumps is unique insofar as the five H-12A and the three K-10A pumps are driven at 180 rpm by a single 1750-hp synchronous totally-enclosed motor equipped with air-to-water cooler. The H-9 pump and one of the K-7 pumps are driven at 360 rpm by a 125-hp motor, and the other K-7 pump is driven by a 50-hp motor at 1150 rpm.

Dryer section and dryer drainage system

The dryer section, comprising 55 paper dryers and 11 felt dryers of 60-in. diameter each, is divided into three sections. The dryers are equipped with high-speed condensate removers, Duplex steamfits, and completely enclosed driving gears located in the back dryer framework. Automatic felt stretchers are provided throughout the press and dryer sections to insure proper felt operation and long felt life.

The dryer drainage system is a forced-vapor circulating type. The heat control and condensate removal system for this machine presents a considerable departure from the arrangement of conventional systems. The special design was dictated by the requirement that consumption of 140 psi primary steam be held to a minimum and that as much heat as possible be drawn from a secondary 40 psi steam source.

To meet these requirements, and those imposed by the prescribed speed range of the machine of 1400-2500 fpm and the variation of steam pressures up to 30 psi in the dryer sections, five forced-vapor circulating units and a thermo-compressor were installed. This permits the use of 40-psi steam for the main supply and 150-psi steam for evacuation through the thermo-compressor.

Advantages claimed for this system are: (1) It provides the necessary drainage differential up to the maximum speed of the machine; (2) it reduces the primary, high-pressure steam demand and thereby effects an economy of steam consumption; (3) it provides independent pressure and temperature control for each respective group of dryers, and (4) it permits the use of maximum temperatures for all dryer sections, with the exception of the wet-end group which is connected in series.

In addition, a moisture control unit, superimposed upon the main dryer group, insures a high uniformity of temperature control and uniformity of paper product.

The dryer section is totally enclosed with an aluminum hood equipped with air-operated doors that are fitted along the entire front side for easy access. The back side has sliding panels.

Calender and finishing area

The open-side calender stack, with a 40-in. bottom roll and seven 18-in. diameter intermediate rolls, is equipped with patented nip relieving diaphragm arrangement.

From the calender stack, the paper is wound on 24-in. diameter reel spools of a heavy-duty pneumatic reel featuring a 48-in. constant-speed reel drum. Uniform roll hardness throughout the build-up of rolls is assured by controlled nip pressure.

The heavy-duty unwind stand has the necessary adjustments to align the reel spool across the machine and in the machine direction. The unwind stand is equipped with a spool ejector for quick roll handling and a "Tru-tension" device to control the water-cooled diaphragm type air brakes.

The Model "L" winder, with 24-in. diameter drums, shear slitters and motor-driven rider roll, is designed to operate at 6000 fpm. The latest design shaft puller and roll-lowering tables handle the finished rolls of newsprint. Finished rolls are processed through a new automatic roll-wrapping machine and a new roll header prior to being conveyed to the shipping docks.

The finishing and shipping department has been extended to accommodate production from No. 3 machine. This involved, in part, extending the roll-conveying system to move wrapped rolls to the loading dock.

A Liebeck disintegrator at the dry end of the machine handles broke and winder trim. The disintegrator features two rubber-covered shafts each driven by a 125-hp motor. These shafts are supported on the outside (on opposite ends of the tank of tile block construction) by SKF spherical roller bearings and at the inside by water-lubricated laminated plastic-lined bearings. The tank discharges through stainless steel perforated grates.

Bowaters No. 3 Machine and Auxiliary Equipment

Groundwood production

Agitator, in groundwood chest, 60-in. all-bronze horizontal, single-cluster, four-blade steel shaft ..... Black-Clawson Co.
Barker (1), Welldrum, 3-section type, 12 by 67½ ft. ..... Canadian Ingersoll-Rand Co. Ltd.
Coarse screens (3), 5 by 14 ft., vibrating .... Allis-Chalmers Mfg. Co.
Cowan screens (4), three Mark A 180 tons/day capacity each and one Mark E, with rubber-covered rotors and rubber-lined dilution water pipe assembly ..... Appleton Machine Co.
Dirtec units (12), king and regular size ..... Bird Machine Co.
Grinders (6), Great Northern Waterous type, 67 tons/day capacity, equipped with load governors, master governor, and pumping plant ..... Montague Machine Co.
Grinder motors (6), 6000-hp synchronous, totally-enclosed, equipped with air-to-water heat exchangers ..... Electric Machinery Mfg. Co.
Motors (2), 300-hp E-M Sil-Clad, on Warren pumps ..... Electric Machinery Mfg. Co.
Refiners (2), 36-in., single-disk ..... Sprout, Waldron & Co. Inc.
Tiled chests ..... Stebbins Engineering & Mfg. Co.
Vacuum filters (6), 8 by 16 ft. ..... Improved Machinery Inc.

Stock preparation

Agitators (3), 48-in. diam. vertical propeller, Lastiglass-coated with stainless steel sleeves at guide bearings, used on secondary refining chest, decker chest and primary refining chest ..... Black-Clawson Co.
Agitators (8), 60-in. all-bronze horizontal propeller, used on kraft chest, broke storage chest, broke blend chest, saveall feed mix chest, machine chest, hardwood chest and wet broke chest ..... Black-Clawson Co.
Consistency regulators ..... De Zurik Corp.
Cowan proportioner (1) ..... Hydraulic Machinery Co.
Fan pumps (2), type 24 CFV, 23,000 gpm, 575 rpm., one feeding the Bird screens and the other serving the headbox of the paper machine ..... Ingersoll-Rand Co.
Fan pump motors (2), one 150-hp and one 200-hp synchronous ..... Electric Machinery Mfg. Co.
Jordans (2), Royal, with "Accru-Set" mechanism, hard rubber-lined, driven by 300-hp motors ..... E. D. Jones & Sons Co.
Johnson screen (1), vibrating ..... Bird Machine Co.
Pulp meter ..... Trimbey Machines Inc.
Saveall (1), 20-ft. ..... Improved Machinery Inc.
Screens (6), 3A type ..... Bird Machine Co.
Tile chests (21) ..... Stebbins Engineering & Mfg. Co.
Tile linings in wire, couch and accepted screen pits and tray collector; in grinder flumes, rejects flumes, refiner discharge flume and accepted stock trough ..... Stebbins Engineering & Mfg. Co.

Paper machine and auxiliary equipment

Broke disintegrator (1), Liebeck, with two rubber-covered shafts driven by 125-hp motors ..... E. D. Jones & Sons Co.
Calender stack (1), open-side type, 8 rolls, one 40-in. and seven 18-in. diameter ..... Beloit Iron Works
Couch roll, suction, 44-in. diameter, with latest drilling pattern and silencer for noise reduction ..... Beloit Iron Works
Dryer rolls (66), 55 paper dryers and 11 felt dryers, 60-in. diameter each, equipped with high-speed condensate removers, Duplex steamfits and completely enclosed driving gears ..... Beloit Iron Works
Forced-vapor circulating units (5) ..... Ross Midwest Fulton Corp.
Fourdrinier (1), 276-in wire, 2,500 fpm, with six stainless steel suction boxes, 23 table rolls, air diaphragm wire guide and wire tension indicator ..... Beloit Iron Works
Headbox, equipped with air-cushion inlet ..... Beloit Iron Works
Headbox compressor, Hytor ..... Nash Engineering Co.
Heat control and condensate removal system, forced-vapor circulation type ..... Ross Midwest Fulton Corp.
Paper machine drive, multiple-generator sectional type, 16 dc motors ranging from 100-350 hp; three 800-hp generator motors ..... General Electric Co.
Paper machine hood, aluminum construction, totally enclosed type, equipped with air-operated doors ..... J. O. Ross Engineering Corp.
Press section, (3 presses), suction transfer press has 42-in. diameter bottom suction roll and 36-in. rubber-covered top roll; second and third presses have 44-in. rubber-covered bottom suction rolls and 42-in. granite top rolls ..... Beloit Iron Works
Reel (1), heavy-duty pneumatic, with 48-in. constant-speed reel drum ..... Beloit Iron Works
Roll wrapper (1), automatic ..... Stadler, Hurter & Co.
Savealls, stainless steel, for discharge of white water to the tile collector chest ..... Beloit Iron Works
Tile broke chest ..... Stebbins Engineering & Mfg. Co.
Tile collector chest ..... Stebbins Engineering & Mfg. Co.
Thermo-compressor (1) ..... Ingersoll-Rand Co.
Unwind stand (1), equipped with spool ejector and "Tru-tension" device ..... Beloit Iron Works
Vacuum pumps (11), Hytor, five H-12A, three K-10A, one H-9 and two K-7 ..... Nash Engineering Co.
Vacuum pump motors (3), one 1750-hp totally-enclosed, one 125-hp, and one 50-hp ..... Electric Machinery Mfg. Co.
Winder (1), Model-L, 6000 fpm, equipped with 24-in. diameter drums, shear slitters and motor-driven rider roll ..... Beloit Iron Works
Winder drive, mechanical tension type, amplidyne voltage-regulated, with two 150-hp motors on winder drums ..... General Electric Co.

Power and steam

Boiler (1), 350,000 lb/hour steam at 850 psi, designed to burn gas or fuel oil ..... Babcock & Wilcox Co.
Generator, hydrogen-cooled, rated at 32,000 kva ..... Westinghouse Electric Corp.
Turbine, 25,000 kw, with initial steam conditions of 850 psi and 900° F. ..... Westinghouse Electric Corp.

Paper machine drive

The machine drive is a multiple-generator sectional drive which supplies 2675 connected hp in six speed-regulated sections. The drive is electronic-amplidyne-controlled. The 16 dc motors on the machine provide a dispersion of power to the strategically-located points as follows: (1) a 350-hp motor on the calender; (2) four 200-hp motors on the dryer section; (3) a 150-hp motor on the third press; (4) a 150-hp motor on the second press; (5) a motor on the first bottom transfer toll; (6) a motor on the first top transfer roll; (7) a motor on the pick-up roll; (8) a 350-hp motor on the wire drive roll; (9) a motor on the couch roll; (10) a 100-hp motor on the first wire return roll; (11) a 100-hp motor on the second wire return roll; and (12) two 150-hp motors on the winder drums. Individual generators for each section are arranged in three M-G sets, each driven by an 800-hp synchronous motor.

A fourth 300-hp motor generator provides dc power for the winder drive, which provides speed control by ampiidyne voltage regulation of the 200-kw dc generator. The two 150-hp motors on the winder drums are equipped to allow ready adjustment of the relative

(Continued on page 132)

The impact of packaging on the paper industry

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Part I — Factors that have revolutionized the packaging industry; design and production of the package; papers used for packaging

TECHNICAL, social and economic changes in the past quarter century have revolutionized the packaging industry. The impact of developments on merchandising has been felt not only by the paper industry, but also by allied industries such as manufacturers of packaging machinery and equipment, the printing industry and manufacturers of various materials. A perpetual challenge to the packaging industry are the technological advances in the fields of applied science and engineering, in transportation, etc. The development of new or modified containers and of new packaging materials has had its impact on the packaging industry. Similarly, socio-economic changes have exerted an equally tremendous influence on packaging.

The demands created by the newly-developed techniques of merchandising, namely self-selection and self-service, are a challenge to the container manufacturer. The designer has created new packages and improved existing ones to meet the changing economic conditions. Package development has also been affected by automation, competition and manufacturing costs. Other influences that affect packaging include the size of families, employed mothers, apartment living and more leisure time.

According to Norman F. Greenway of Robert Gair Co. Inc. (now a division of Continental Can Co.), a large part of the retail goods sold annually and valued at $200 billion is bought on the basis of packaging alone, with little or no help from sales people. In this era of self-service and the supermarket, a very large portion of the American business rises or falls on the ability of its package to translate billions of dollars worth of sales effort, advertising, merchandising and promotion into action at the point of sale.

Estimated expenditures for packaging in 1955 increased to approximately $12 billion. Of this amount, $8 billion were expended on consumer goods and $4 billion on industrial products packaging. Paper played an important role in these expenditures. Paperboard production in 1955 was over 14 million tons, a record figure. Production of paperboard has increased nearly 50 per cent in eight years. Packaging is chiefly responsible for this increase.

An ever-increasing number of consumer products are appearing in newly designed containers which are warranted by increased sales and profits. California date growers have increased sales 50 per cent by the use of folding paper boxes. A cigarette manufacturer increased sales 5000 per cent as the result of a new hinged-lid folding paper box. To compensate for rising labor and costs, the packaging industry is endeavoring to help packagers increase productivity by developing new machines and new containers to simplify the job. The usual types of packages and filling equipment are rapidly giving way to newer, faster-filling packages and more efficient packaging machinery. Films and foils applied to paper have improved product protection and appearance; non-slip finishes make containers easier to handle, and new closures make them easier to fill. New ways of applying automation to increase productivity of the filling and packaging operations are already here.

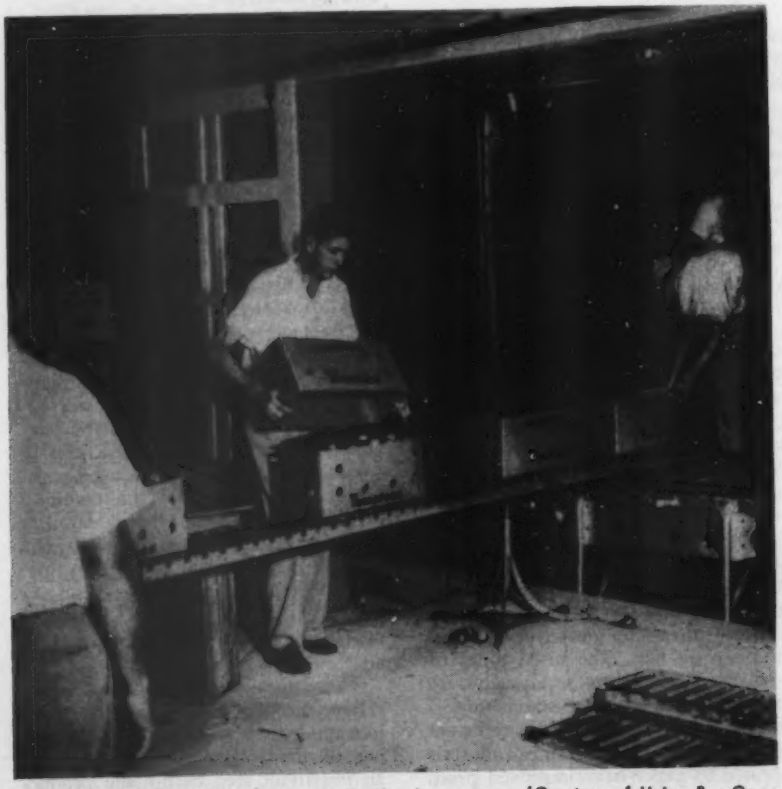
The package — its design and production

While the basic objective of designing a package is to promote the sale of merchandise, the first and most important function of the package is the adequate protection of its contents, over the normal span of its distribution and use and to the satisfaction of the consumer.

The contents of the package are usually indicated on the package in a manner to attract the attention of the buyer. This involves the integrated work of many people. For instance, the package technician is an authority on materials for packaging and knows how to test them; the package designer is concerned chiefly with the external and visible aspects of the container and with consumer reactions to color and design; the packaging engineer's contribution is the planning of the package, since he is familiar with packaging machinery and the layout for an efficient production line. The packaging engineer is also experienced in types, sizes, colors and other factors affecting public acceptance.

The determination of consumer reaction, through a market study by an independent consultant, or by a member of the company organization, is an important step before the production stage is attempted. Production

Self-selection and self-service are a challenge to the container manufacturer. (Courtesy of Continental Can Co. Inc.)



In packing bulk tomatoes, adequate protection is necessary. (Courtesy of Union Bag-Camp Corp.)

statistics and other information relative to the product to be packaged may be obtained from trade associations and other sources.

Principles of package design indicating the thought that must be given to the planning and production of a given package are cited by T. J. Gross, technical advisor, Union Bag-Camp Corp. Referring basically to corrugated containers, principles of primary consideration are: (1) protection, (2) conformity to carrier regulations, (3) adaptability to production facilities and (4) adaptability to storage and distribution methods. Those of secondary consideration are: (5) cost, (6) advertising and display features, (7) re-use, and (8) consumer acceptance and convenience.

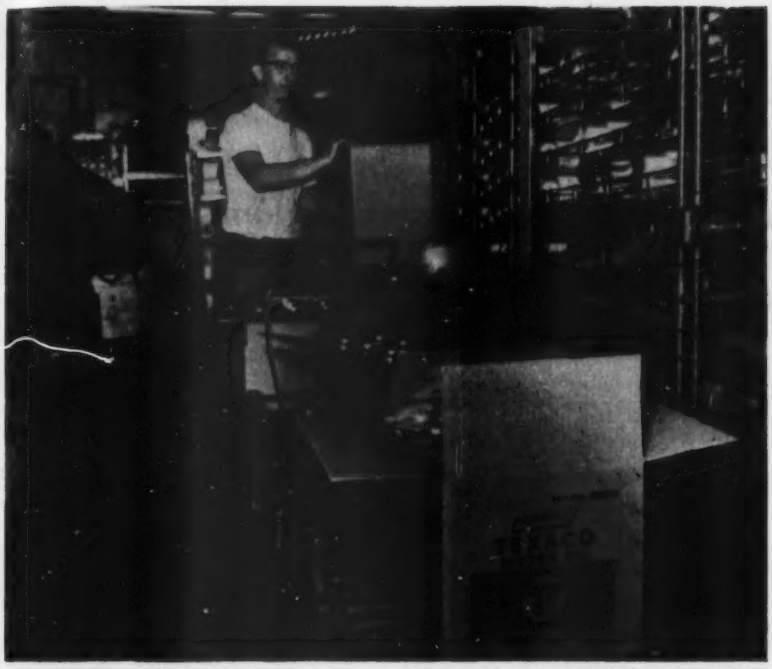
The hazards of travel to which a package is exposed are: (1) impact or shock, (2) vibration, (3) puncturing blows, (4) crushing, (5) temperature changes, (6) humidity conditions, (7) exposure to water, (8) scuffing, (9) contamination, and (10) pilferage.

There are 15 basic principles of package protection to resist the hazards of travel. These are as follows: (1) sufficiently strong enclosure to protect product from outside contacts, (2) sufficiently strong container to retain its contents, (3) sufficiently rigid container to hold its form under stress, (4) product must fit properly into container, (5) use of separators with multiple contents, (6) adequate cushioning, (7) compatibility of container and its contents, (8) added support to package, if necessary, (9) adequate clearance of packaged product for its surface protection (use of spacing blocks and protective wraps as needed), (10) adequate distribution of load-bearing surfaces, (11) proper position of article in container, (12) use of principle of suspension, if needed, (13) exposure of product for ventilation and inspection, (14) closure, and (15) advertising and instruction (identification of contents of package, handling instructions, etc.).

Successful packaging requires that these 15 principles be considered in package design, to a more or less degree depending on the nature of the product and the use requirements involved. These basic requirements must be met, not only by the paper and converting industry, but also by those allied industries supplying materials and equipment. All these must cooperate in the production of the successful package.

Papers used for packaging

The versatility of paper as a packaging material is well known. Used alone or in combination with other



Setting up and filling corrugated box with motor oil in cans. (Courtesy of Texaco)

materials for specific applications, paper in its various forms possesses those properties required for modern packaging. Paper is readily engineered to perform a variety of packaging jobs, ranging from simple, low-cost protection to a complex, multi-function performance. It is economical to use and is constantly replacing other packaging materials.

For packaging purposes, papers are designed to provide such properties as high wet-strength; high impact or tear resistance; resistance against water, water vapor, specific gases, oil and greases; resistance against molds, tarnish, flame, insects and rodents; and prevention of corrosion and formation of molds on the packaged products. Paper is well suited for packaging food products because it is naturally non-toxic, odorless and tasteless. Paper can be produced with good aging properties in accordance with specifications, and the ready printability of paper is a real asset for brand identification and for information purposes. All these properties have made paper very popular with manufacturers of all kinds of goods.

The basic packaging papers are kraft (natural color and bleached), glassine, vegetable parchment, waxed and tissue. Combinations of treatments and use of coatings and support materials provide a widely diversified group of packaging materials and label papers for ever-broadening applications. Of the packaging papers mentioned, kraft paper is undoubtedly in greatest demand. It has been claimed that kraft paper, in one form or another, is used in connection with every important product.

Many packaging papers are designed especially for their protective function as well as for a material function, such as blocking resistance, heat sealing, gloss, scuff resistance, and release properties. The protective function may include protection against corrosion, molds, gases, water, odor, greases and oils, chemicals, and organic solvents. Protective coatings, which impart these protective functions, can be conveniently grouped as follows: (1) hot melts; (2) solvent coatings; (3) emulsion coatings; and (4) extrusion coatings.

Some of the typical materials used in hot melt coatings are (1) refined paraffin wax; (2) modified paraffin wax (microcrystalline wax); (3) wax with added materials such as resins and plastics; and (4) film-forming resins with relatively small percentage of modifying agents, such as wax, non-film-forming resin and plasticizers. Hot-melt coatings have the advantages of low cost, low fire hazard and quick drying. These coatings have heat-sealing properties. Film-forming resins, like ethylcellulose and polyethylene, are used to impart blocking resistance, toughness and flexibility, and to increase the heat resistance of the film in addition to other desirable properties.

The application of solvent coatings involves the use of a film-forming resin, such as nitrocellulose, ethylcellulose, the polyvinyls, polyethylene, rubber and rubber derivatives, etc., with a non-film-forming resin to impart hardness and gloss, and a plasticizer to make the film flexible. All of these constituents are dissolved in suitable solvents. Solvent coatings are used for decorative wrappers, food wrappers and bottle-cap linings. They can be applied as overprint varnishes. The coatings may include such properties as resistance to water, water vapor, grease, alkali, and heat sealability.

Using high-solids emulsion coatings, it is possible to produce films which have a high gloss, good scuff resistance and resistance to water, oils and water vapor. The materials used in emulsion coating include rubber latices, waxes and resins in aqueous emulsions. To obtain good water and water vapor resistance, it is necessary that the dispersed material in the emulsion coalesce on drying to form a continuous film or coating. Polyvinyl acetate or chloride emulsions are available in several different formulas, as well as synthetic rubber latices and polyvinylidene chloride-polyvinyl chloride copolymer emulsions. Ethylcellulose, acrylic resin, nitrocellulose lacquer, polyvinyl butyral, polyethylene, and polystyrene emulsions are also available. The main advantage of aqueous emulsions is their higher solids content when compared to solvent coatings.

(Continued on page 132)

Tough extruded polyethylene crating resists heat, moisture and solvents. A laminate of foil, paper, and polyethylene. (Courtesy of Riegel Paper Corp.)

Organic coatings for paper

Part XIII—Polyesters, phenolic resins, urea and melamine resins, silicone resins, quilon, sulfonamide-formaldehyde resins, asphalts and oleo-resinous varnishes

Urea and formaldehyde resins are characterized by excellent color properties. They further have a high degree of oil-, grease-, and scuff-resistance. The silicone resins' outstanding properties are their chemical inertness, water repellency and release characteristics.

IN ADDITION to the resins already discussed, numerous other resins are used, or have potential uses, in paper converting. Some of these are briefly discussed in this concluding article of the published series on paper coatings.

Polyesters

Included in the category of polyesters are the alkyd resins. A class of polyesters that are condensation polymers of glycols and unsaturated dibasic acids, such as maleic anhydride, is heat converted by combining it with styrene in the presence of a peroxide catalyst. These resins are used to laminate sheets to paper. After curing, these laminates are very hard and have a high finish. They are further characterized by excellent water and chemical resistance, which makes them suitable for such uses as counter tops, sinks and table tops. Actually, these compositions are largely structural in nature and differ in that respect from the normal type of coated paper.

Non-drying types of polyesters, such as alkyd resins based on glycerol, phthalic anhydride and saturated fatty acids, are used as plasticizers for nitrocellulose, ethyl cellulose and other lacquer forming resins. When such alkyds are made with unsaturated fatty acids, compositions result which are similar to drying oils. These drying types of alkyds may be reacted with styrene, and the resulting styrenated alkyds are of interest as paper coatings. They are used either alone or in combination with melamine resins to provide high-gloss coatings with reasonably good barrier properties. Resistance to alkali, however, is generally poor, and the coatings tend to be on the brittle side. However, they are of value where gloss and decorative properties are the chief consideration. Styrenated alkyd coatings require very high drying temperatures, which tend to embrittle the papers.

Phenolic resins

Phenolic resins are produced by the condensation of phenol and formaldehyde under a variety of conditions. Depending on the pH used during the condensation and the ratio of reagent, either thermoplastic or thermosetting resins may result. Phenolic resins in general are characterized by poor color, which limits their use in decorative applications. Phenolic resins, however, have a high degree of resistance to acids and chemicals and on the whole reasonably good resistance to alkali. They tend to be brittle, but this can be remedied by the addition of a wide range of plasticizers with which phenolic resins are compatible. Phenolic resins are used with paper in the same manner as polyesters to produce molded laminates that have structural uses. Because the phenolic resins have good electrical properties, varnishes based on phenolic resins are used to impregnate kraft paper to obtain electrical insulating paper.

Urea and melamine resins

Urea and melamine resins are formed by the condensation of urea or melamine with formaldehyde. From a chemical point of view, therefore, these resins are related to phenol-formaldehyde condensates. Urea and melamine resins, unlike the phenol-formaldehyde resins, are characterized by excellent color properties. They are non-toxic, and coatings based on these resins show a high degree of scuff resistance as well as excellent resistance to oils and greases.

In the early stages of condensation, urea-formaldehyde resins are water soluble. In the later stages of condensation they are soluble in organic solvents, particularly if alcohol modifiers such as butyl alcohol are present. These alcohol modifiers actually enter into the condensation reaction and provide soluble urea-formaldehyde condensates. Both urea and melamine-formaldehyde resins require long curing cycles, and this is a drawback in paper converting. Festooning, however, can be used, and the paper may be either impregnated or coated. Urea resins should be of interest to the paper converter in the preparation of papers for cap and bottle liners where the excellent chemical resistance of the resin is a definite advantage. The paper impregnated with urea resin may be used as a surfacing material for less expensive laminated paper structures prepared with phenolic resins. The urea impregnated paper, of course, has better color and is more decorative than the phenolic impregnated product.

Melamine resins have even better color than urea resins, although they are more expensive. They also show better chemical resistance and re-

quire lower temperatures for curing. Papers impregnated with melamine-formaldehyde compositions have a high degree of water and moisture resistance and excellent electrical resistance. Such papers are also fire-retardant. Both urea and melamine resins are used as heater additives to impart wet strength to paper.

Silicone resins

Silicone resins are semi-inorganic polymers made up of a skeleton structure of alternate silicon and oxygen atoms with various organic groups attached to the silicon atoms. Chemically they are referred to as organosiloxane polymers. They are available in many physical forms, varying from low-viscosity liquids to rubber-like elastomers.

Silicones have many unique properties, the most important of which from the paper converting point of view are their chemical inertness and "release" characteristics. An additional property that is of interest to the paper coater is the high degree of water repellency shown by silicones.

Treatment of paper with exceedingly thin films of silicones provides a permanently non-sticking surface which minimizes the adhesion of such materials as unvulcanized rubber, camelback, tar, asphalt, medicinal powders, meats and bakery doughs and mixes.

Silicones are soluble in many organic solvents, such as aliphatic and aromatic hydrocarbons, chlorinated solvents, acetone, methyl ethyl ketone, etc. The silicone solutions can be applied to paper by dip or roller coating techniques. After the solvent is removed by air-drying or heating, the thin film of silicone is cured for 3-5 min. at 300°F.

Should it be desirable to reduce the curing schedule to 30-60 sec. at 250°F, a catalyst such as Zinc Octosol (containing 8 per cent zinc) is used in a proportion of 25 parts Zinc Octosol to 100 parts silicone. Some catalyzed silicone solutions remain stable for at least 24 hrs. Because of their relatively short life the catalyst should be added just prior to the application of the coating.

Silicone emulsions are prepared by mixing the ingredients, containing in addition to silicone and water small quantities of Dupanol G and Calgon and sufficient glacial acetic acid to reduce the pH to about 6, in a colloidal mill or in very high-speed mixers, e.g. an Eppenbach mixer or Waring blender.

The dried film is cured for 3-5 min. at 300°F or at 10-15 min. at 220°-300°F. As in the case of the solvent solution application of silicone, the curing cycle may be reduced to 30-60 sec. at 250°F by the incorporation of 25 parts Zinc Octosol per 100 parts of silicone.

Among the new introductions of silicones are a water emulsion, i.e. Dow Corning XET-5087, for the treatment of parchment and kraft, and a solvent solution, i.e. Dow Corning XT-4462, for use on glassine, cellophane and plastic foil.

XT-4462 is a 30-per cent solids solution of a silicone polymer in xylene. Dow Corning catalyst XY-27 is supplied with each shipment of this product. Since the addition of this catalyst results in the evolution of minute quantities of hydrogen gas, the catalyzed solution should not be stored in closed containers. Provisions for adequate ventilation should also be made.

XET-5087 is a silicone emulsion that cures much faster than previous silicone emulsions and permits the application of a silicone film on one side of the paper sheet. This emulsion is supplied at 40-per cent silicone solids, and each shipment is accompanied with Dow Corning catalyst XEY-21.

A typical formulation for a 4-per cent silicone solids bath is as follows:

100 gm Dow Corning XET-5087
870 gm water
10 gm glacial acetic acid
20 gm Dow Corning XEY-21

The usable life of the catalyzed emulsion with the acetic acid inhibitor is 4 hrs. Since minute quantities of hydrogen are evolved from the catalyzed emulsion, adequate precautions of ventilation and avoidance of closed containers are recommended.

Following the application of the emulsion, the paper sheet is heated for 1-2 min. at 235°-250°F to effect proper drying and curing.

Quilon

Chemically, Quilon is stearato chromic chloride. It is a relative newcomer to the field of paper converting and is available as an isopropyl alcohol solution. When applied to paper it improves water repellency, gives better release characteristics and improves size. Thus, its primary value is as a waterproofing agent. Quilon is used on kraft paper which is to be formulated into bags used for ice delivery. Quilon prevents the ice from sticking to the paper and at the same time waterproofs the paper. Quilon-coated paper is also of interest for packaging of frozen foods. Casualty blankets used in civil defense programs have been made by coating paper with a combination of Quilon and ammonium sulfamate. The Quilon contributes water repellancy, and the sulfamate imparts fire resistance.

Quilon may be combined with polyvinyl acetate emulsions to provide grease-resistant coatings for bakery cartons.

Sulfonamide-formaldehyde resins

A series of resins may be produced by condensing formaldehyde with aryl sulfonamides such as p-toluenesulfonamide. These resins vary in physical form from sticky materials to hard, brittle substances and are very light in color. Their primary use is in combination with nitrocellulose and ethyl cellulose for the production of heat seal coatings and moisture-proof lacquers. Thus, these resins improve markedly the heat seal characteristics of nitrocellulose. They also increase the toughness and flexibility of ethyl cellulose films. However, they tend to release formaldehyde when heated and cannot be used with coatings which are to be subjected to heat for long periods of time.

Asphalts

Asphalts are inexpensive, semi-solid black mineral-like materials. Chemically, they consist largely of paraffinic hydrocarbons. Although asphalt is not used as a paper coating ordinarily, it is used widely as a moistureproof laminating agent for kraft paper. Asphalt is also used as a waterproof liner for cartons and for bags which are to contain food materials where waterproofness is an important consideration. Asphalt-laminated papers are used widely for export shipments and for the packaging of ordnance materials.

Oleoresinous varnishes

Oleoresinous varnishes are combinations of drying oils such as linseed or tung oil with a wide variety of natural and synthetic resins. Among the resins which may be used are rosin and rosin derivatives, naturally occurring resins such as Dammar and synthetic resins such as the phenolics. These materials have been used for many years as paper coatings. They are still being used for papers which are to be fabricated into cap liners and for the coating of electrical insulating paper. Clear inks used in letter press printing as overprint varnishes are also based on oleoresinous coatings.

Tree farming and forest economics

BERNARD L. ORELL
Vice President
Weyerhaeuser Sales Co.

The national lumber industry, consisting of 55,000 manufacturing units, produces annually 40,000,000 bd. ft. The pulp and paper industry, encompassing 804 paper and board mills and 330 pulp mills, produces 31,500,000 tons of paper and board and 22,200,000 tons of pulp annually. There are currently 41,500,000 acres of timberlands owned by 9594 tree farmers in 44 states.

THE FOREST PRODUCTS industry is the key to the economy of each of the Pacific Northwest states. This industry is comprised of (1) lumber, plywood, hardboard and allied products and (2) pulp and paper manufacture. The two are very different.

Very few people carry with them a true picture of the size and complexity of lumber production and marketing. The industry produces annually about 40,000,000 bd. ft. for the nation as a whole. This comes from 55,000 manufacturing units and is marketed by 12,000 wholesale distributors and 26,000 retailers. The largest single producing company aggregates slightly more than 3 per cent of total output. No distributor handles as much as 4 per cent of the lumber passing through distribution firms. The manufacturers are essentially small businesses, with 98 per cent of the mills each producing less than 5,000,000 bd. ft. annually. This complexity of production and distribution causes the industry to be particularly sensitive to changes in the economic pattern.

Contrasted to this very diverse and loose industrial structure, the pulp industry is one demanding huge capital investments in plants, with relatively few manufacturing units. In 42 states in 1956 there were 804 mills making paper or paperboard and 330 mills manufacturing pulp. These represented an investment in property of $7,800,000,000. Of these, 82 mills are in the state of Washington, 51 in Oregon, and one in Idaho. Montana has none, but one is under construction and two more are planned. Washington leads all states with 13.1 per cent of the total U. S. pulp production. Oregon produces 4 per cent of the total. This industry is stable, does not feel the effect of minor ups and downs in the economic cycle and has been benefited not only by rising population trend, but also by rising per capita consumption.

What is tree farming?

Tree farming was born in the Pacific Northwest with the dedication of 120,000 acres in western Washington's Grays Harbor County in 1941. Since that time the movement has spread to 44 states and encompasses 9594 tree farmers who own 41,500,000 acres of timber land. In the Pacific Northwest slightly more than 1300 tree farmers have dedicated 9,000,000 acres to permanent tree growth.

Tree farming is a privately sponsored movement in which individual and company forest land owners dedicate the lands under their management to permanent timber production, the provision of adequate protection against fire, insects and disease, and the provision of a high degree of management practices. The objective of all tree farming activity is the attainment of the maximum growth potential on all timber lands.

Tree farming has had a tremendous influence on the development of forest management practices and utilization throughout the country. Classed by some in its early stages as mere window dressing, it is now recognized as a sound, intensive program and as a positive influence on private and public land managers.

Percentagewise, the acreage involved is relatviely small as compared to the total acreage of commercial forest land in any one state, region or the nation. Tree farming, however, in spite of the small percentage figure, has developed a public consciousness of the forest resource as renewable. It has helped establish the value of the growing tree, and this has been a direct influence on legislators and congressmen with regard to appropriations for governmental forestry activities. It has encouraged the small woodland owner to do a better job on his lands. It has focused attention on the fact of managed timber harvests providing the most favorable climate for game production, high watershed values, fishing opportunity and general recreation with easy access. In short, tree farming has become a catch phrase that has taken the eye of the public and is associated with the systematic growing of recuring crops of trees, though many associate this activity with agencies of federal or state government and not with its true sponsorship — private industry.

Trees are a liquid asset

The economic picture of the Pacific Northwest is one that is bound up with forest economics and therefore with tree farming. Twenty-five years ago the individual tree in the woods had literally no value. Liquidation of the standing tree and its conversion into products which could be sold was necessary. Today, that individual tree is valuable from the time it first starts to grow until it is cut at maturity. It can be used as a basis for obtaining credit, it is hockable, and it is saleable. It is a liquid asset. It now pays to invest capital in trees at all stages of their normal life. This factor is tremendously important because it is essential to the investor of money in conversion facilities that control of a substantial part of the source of raw material is attendant to that development.

One of the best measures of the economics of tree farming is the value of the forest products produced in the various states. In Oregon, the total was $1,175,200,000 in 1955. Eighty-eight thousand employees were paid a whooping $424,000,000 in wages. In Washington, the product value produced was just short of $900,000,000 in the same year, with a total of 73,000 direct employees taking home wages in the amount of $343,000,000. Substantial parts of the economy of California, Idaho and Montana are

based on wood. California, incidentally, is the No. 2 state next to Oregon in the production of lumber. These dollar values clearly illustrate the importance of tree farming and forest management of all lands, public and private, to every business, profession or activity in the Northwest.

What are the market prospects?

The forest industry looks ahead. The immediate market prospects are fraught with difficulties. Product demand in both lumber and plywood is definitely off. This is related almost directly to the fact of housing starts being down, though in the case of plywood a further complication is the recent development of an excess productive capacity.

Pulp and paper markets are also off, though not as sharply as is the case with the lumber industry. The pulp industry today is running at about 85 per cent of capacity and probably will continue at that rate through most of the year.

While markets are definitely off from the post-war highs, the raw material supply situation is continuing to improve through higher degrees of private forest management, better utilization practices and product research. The public agencies are also doing a steadily better job of managing their properties, all of which gives for the immediate future a very favorable resource supply picture.

Probably few industries must look further into the future than the forest industry. Millions are being invested today in planting, reseeding and protection of trees to be harvested 40, 80 or 120 years hence. Therefore, future markets and raw material supply trends are studied intensively. Two surveys supply the basis for estimating the patterns of the future — the Stanford Research Institute's America's Demand for Wood, 1929-1975" and the preliminary draft of the "Timber Resource Review" based on 1952 statistics and made public by the U. S. Forest Service in 1955. The latter is a summary of the forest resource picture in 1952 with predictions as to wood demand and forest growth in 1975 and 2000. The two reports are in substantial agreement on nearly all points and in totals for 1975. The T. R. R. uses two levels of demand, designated as low and upper. The low level assumes a continuing per capita consumption decline of lumber due to a rising cost factor and consequent inroads of competitive construction materials. The upper level assumes the maintenance of lumber's present relationship with other construction elements. Both assume that management and utilization practices will not intensify in the future at the pace of recent years.

The approach to product demand in the long range cannot help but be one of optimism. Our increasing population trends will create an increasing demand for new housing, for the refurbishing of old housing and the replacement of modern housing in slum areas of our larger cities. Housing is the most important single factor in lumber and plywood demand. By all predictions, pulp and paper product demand will continue to rise in per capita consumption. Assuming no major war and no major depression, forest product demand prospects over the long range in this country are excellent.

Continued availability of raw wood material

The key to the future of the forest industry, particularly in this region, will be in the continuing availability of raw wood material. A reasonable balance is indicated by the T. R. R. through 1975, but controversy and differences appear over the predictions for the year 2000. Utilizing these figures, we can be extremely pessimistic, extremely optimistic or considerately optimistic. The individual approach to this phase of the future depends on the background of the individual, the objectives he would further and his approach to the private enterprise system vs. socialism.

The upper level prediction of the T. R. R. indicates a shortage that could be as much as 76 per cent timber cut over timber growth. This would be of disastrous proportions, and the passimist utilizes the figure for all sorts of dire developments. He advocates price supports, subsidies and government controls as necessary to forestall the impending calamity. The optimist points to present favorable balance of growth vs. cut, the predicted low level balance in 1975 and the near low level balance in 2000 and assumes that all is well and no problems exist. The actual factors of growth and cut undoubtedly are at levels between the two.

Based on the general agreement of there being sufficient commercial forest land in the United States to provide the wood needs of the country if sufficiently intensive practices are applied, the considerate optimist looks forward to continued balance between growth and cut. He realizes there will be shortages by region, species and type. Tough problems of fire control and prevention and insect and disease attack must be overcome. He recognizes the small woodlot ownership factor as a most important problem of management development. He also knows that economic factors, based on the ratio of raw material supply and demand, will exercise a positive role in determining the degree to which management and utilization intensify on all ownerships.

If the raw material supply develops a trend sharply below the demand level, stumpage and product cost will go up, competitive materials will enter the field further, and expanding demand will be limited. Added to this, rising stumpage and product returns will inspire more intensive forestry and utilization practices with a corresponding rise in growth potential. The assumptions upon which the upper level is based cannot be maintained. The figures are a possibility only if economic factors are ignored. They should not be used as a prediction of timber shortage, nor do they indicate prohibitive product costs to the consumer.

Here in the Pacific Northwest old growth forests are being harvested. The cut is substantially greater than growth, though this ratio will decrease steadily. In Oregon, particularly, the industry is faced with adjustment in its total harvest in the years ahead as reproduction and second g r o w t h stands replace the old. Conversion capacity will have to be geared to the growth capacity of the land. This will be at a very high level, the actual degree of which will be determined by the intensity of management applied to private and governmental forest lands.

The future of the forest industries is bright. The raw material supply picture is good, and we are continuing to intensify research activity in forest management and utilization, both in the woods and mill. Tree farming of private forest land will continue to grow recurring crops of trees. A balance of timber supply and demand will be attained through public understanding of tree farming, a vigorous private and governmental attack to minimize the problems of fire, insects and disease, the establishment of markets for the products of small wood lots and the utilization of every acre available for maximum tree potential. As tree farming grows, so will grow the forest economy of the Pacific Northwest.

A planned program for a future supply of technical manpower

W. J. NOLAN*

In this paper presented at a meeting of the Southeastern Section of Tappi, Dr. Nolan presents a five-year training program to insure a future supply of technical manpower, which will be of interest to most mill executives.

IN THE PAST few years the demand for graduating seniors in all branches of engineering has been increasing much more rapidly than the supply. The competition between companies for services of the new engineers has become so severe that almost fabulous salaries are being offered, and the students are acquiring exaggerated opinions of their position in the technical field.

Last year, the average of all offers from industrial organizations of all types to the graduating engineering students at the University of Florida was $435.00 per month. The average acceptance salary was considerably higher than that figure, although the exact amount is not available. Final average figures for this year are not yet available, but some typical offers will show the trend in salaries caused by this competition.

One large company has thus far made 24 offers, 14 of which ranged between $500.00 and $560.00 per month. The other ten offers averaged $480.00. Another company made offers as high as $580.00 and $650.00 per month. These high offers were not made specifically to those seniors in the top third of the class. Rather, the recipients of these offers can be considered close to over-all average students. It is expected that the average acceptance salary this year will be about $500.00 per month. The fields of manufacturing and processing from which most of these offers came, and with which most of the graduating engineers are affiliating themselves, are oil, rubber, chemical, electronics, general engineering consultants and similar lines.

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Where does the pulp and paper industry stand?

Where does the pulp and paper industry fit into this highly competitive bidding for new engineering talent? One of the largest pulp and paper companies is offering $425.00 per month, while another has gone as high as $450.00. It seems quite doubtful that, even if the mills increase their offers between now and next June, our industry will acquire anywhere near its share of the graduating seniors.

In addition to this discrepancy in salary offers, we are also faced, in this scramble for new chemical engineers, with another handicap not felt by such process industries as petroleum, chemicals, rubber, etc. In the past, the paper mills in many cases have tended to make routine bench chemists of their new chemical engineers. The new men have had comparatively few opportunities to apply their engineering training in either production or research. It is true that a good many were employed in research departments, but their actual duties were more in the nature of routine control than true research.

A very few paper companies have for many years recognized the importance of chemical engineering principles in pulp and paper processing and have been using the technical talents of their new engineers accordingly. More and more companies are recognizing this need for chemical engineering training rather than for a graduate who is expert in quantitative analysis. Unfortunately, past practices have created a reluctance on the part of engineering students in general to enter a field in which they feel that the opportunities for development in their chosen profession are limited.

If this inadequate supply of new technical talent for the paper industry is serious today, how much more serious will it become in the next few years. Our industry is expanding very rapidly and a doubling of capacity within the next 20 years is a widely accepted prediction. In fact, this prediction may fall far short of actuality, especially in the South, as processing techniques for the hardwoods improve. It would appear that the time has arrived for the paper industry to take concrete measures to insure a steadily increasing supply of trained engineers.

What methods are used to influence students?

The situation might be compared to the procurement problem faced by the major universities in developing a good football team. Years ago outstanding high school players either attended college near home or gravitated toward those schools having outstanding records or coaches. Now, however, the coaching staff of a university must recruit its talent, offer scholarships, grants-in-aid, etc., to induce outstanding players, very often local talent, to attend that university. Do not be surprised if a somewhat more conservative model of these recruiting practices develops for the training and hiring of our future engineers.

In fact, I believe that a start is already being made in this direction. Some of the large petroleum industries are sending lecturers into the high schools to point out the attractions of an engineering profession and to alert those students planning an engineering career to the need for

electing the maximum number of credits in mathematics and the physical sciences as a foundation for their further training at the college level. This is a form of missionary work that should have been initiated years ago to combat the so-called broadening influence in education. The influence of these lectures on engineering will undoubtedly result in an increase in enrollment in the engineering schools to help alleviate the shortage. There is probably some faint hope, also, that some of the personality of the lecturer will rub off on the future engineers, resulting in a preferential position for his company's interviewers four years later.

There are several methods that can be used to induce students to major in engineering, which will also influence them toward a particular industry. One that is widely used is the annual scholarship which pays part of the student's expenses. This is a highly laudable practice; but, as a means of influencing the students' thinking toward a particular organization it is not too effective. There is not sufficient contact, usually, between donor and recipient to make this latter effect prominent.

Another method for assisting the student consists of the Industrial Co-operative Plan. In this co-op system, the student alternately attends a university full time for one semester and works full time in the company's organization during the following semester. The plan usually does not become operative, however, until the start of the sophomore year and, consequently, does not particularly influence high school graduates into an engineering profession.

This co-op plan is much more effective than the scholarship. By working full time in the company's organization during alternate semesters, the student is able to save enough to pay most or all of his expenses while in school. He develops a thorough knowledge of the company's processes during these periods and makes personal contacts which are often lasting. One minor disadvantage of this system lies in the periodic interruptions in the student's formal training, which may tend toward decreased efficiency. A major disadvantage may lies in the acquiring of a detailed knowledge and mental acceptance of the processing methods of the sponsoring company before a sound theoretical background has been developed. This acceptance of existing methods may result in fewer improvements in technology than would result when the graduating engineer enters the industry without preconceived ideas as to methods of operations.

A new 5-year program

I would like to suggest a plan by which the student may acquire the complete fundamental training in chemical engineering principles, pay all of his living expenses while at the university and, at the same time, acquire a thorough knowledge of the pulp and paper industry. The program will require five years, at the end of which period the student will have completed all of the theoretical requirements and receive the B.S. degree in chemical engineering. The plan would work about as follows.

A pulp mill will sponsor a high school graduate who is interested in studying chemical engineering. The boy should be a native of the town in which the mill is located, possibly the son of a mill employee. The mill will sponsor this student to the extent of paying him $1.25 an hour for a weekly maximum of 20 hours work as a part-time technician in the Pulp and Paper Laboratory at the University of Florida. While working as a technician he will be taught all routines on wood handling, cooking, bleaching, physical testing, analytical procedures, etc. Once or twice a week he will be given hourly lectures, in which the reasons for the various routines are explained in a semi-technical manner.

While working in the laboratory to pay his expenses, the boy will be enrolled as a full-time student in the engineering college of the university. He will carry 12 hours of course work a semester, the minimum permitted by the university for full-time registration. With this reduced load, the average student should not be overloaded by his part-time employment. The reduced study load has an additional advantage for boys from high schools whose mathematics and science departments are understaffed. The slower pace of this schedule will permit the student to catch up with those with more thorough secondary training. The result: a reduced probability of failure.

The complete program will require five years, including three summer sessions. For the first three years the student will spend his time entirely at the university. In the summer of his fourth year he will be employed at the mill of the sponsor. By this time he will have covered thoroughly, as a laboratory technician, all the processing involved. He will have learned the principles of pulping, bleaching and fiber processing from a much broader viewpoint than can be obtained from the operation of a single mill. Therefore, as he picks up his practical mill experience he will not lose his broad perspective and is not apt to accept existing mill processing as necessarily the best for that particular mill.

How thorough the training under this program?

The combination of classroom training in the fundamental sciences and practical work in the laboratory has many advantages. Let us consider alkaline pulping as an example of how this combination works out. During his first two years in the laboratory the student will have carried out cooks over wide ranges of time, temperature, concentration, liquor ratio, etc. He will have measured the effects of these changes on yield, strength and chemical analysis. Then, in the third year his theoretical training begins to show him the scientific interrelationship of these variables on chemical reaction rates. Now he is in a position to combine theory and practice. As his theorectical training develops, he immediately sees the practical application of all his new scientific principles to the specific pulping processes that he has already handled empirically. This on-the-spot correlation of scientific principles to actual pulping procedures should fix these principles more firmly in his mind and make him more versatile in later technical analysis of new mill processes.

By the time the student has completed three years of part-time work in the laboratory he should have learned all of the standard procedures normally used. Therefore, the character of his training will begin to change in his fourth year. By this time he will have acquired sufficient scientific background so that he can take the first steps toward independent research. During his fourth year he will begin work on a specific research problem in which the sponsoring mill is interested. He will work independently on this problem under close supervision of the technical staff. It is expected that during the fifth and final year his technical supervision can be reduced to a minimum, thus developing the student's ability to work alone. During this fifth year he will be expected to prepare periodic reports and submit a final report to the company. Thus, it is expected that the man graduating from this program in five years with a B.S. degree will actually have the equivalent, researchwise, of a masters degree.

Relationship of student to university and company

In this scheme of training there would be no formal connections between the company and the university.

(Continued on page 132)

Pulp washing—a panel discussion

Moderator: Harry E. Weston, American Pulp & Paper Mill Superintendents Association

Panel Members: C. K. Textor, The Bauer Bros. Co.; H. K. Waters, Swenson Evaporator Co.; Ward Pitkin, Dorr-Oliver Inc. (substituting for Thomas B. Calhoun of Dorr-Oliver); Bruce Armstrong of Appleton, Wis.; C. W. Converse, Sprout, Waldron & Co. Inc., and Edwin Kemp of Bauer Bros. Co.

THE FOLLOWING is a continuation of a transcript of the discussion of pulp washing held on December 4, 1956, as part of the Fifth Annual Pulp and Paper Conference at the University of Florida, Gainesville. For purposes of better continuity, the questions and answers have been regrouped, insofar as possible, under definite subject headings.

Screw-press and drum washing combinations

Q. (Mr. Ernest G. Evans, Union Bag-Camp Paper Corp.) Mr. Armstrong, you mentioned a pressure-washer, drum-washing combination. Have you had that actually operating in the mills?

A. (Bruce Armstrong) There are two of those installations presently being made. The start-up has been made. They are getting ready to run. Information should be available in a month or so. All the test work was done on a small pilot machine of about 20-25 ton-per-day capacity. Three separate washing stages were run through on the unit, right in the mill, under mill conditions. The commercial installation of 350 tons is just starting to run. I do not have the data yet. It will be at least a month before they become available.

Q. (Mr. Evans) You mentioned three stages. Is that one pressure washing stage and two drums?

A. (Mr. Armstrong) No. They have two lines each with a two-stage vacuum-type washer followed by one press. The vacuum washer is a single unit with two separate effluents.

Q. (Mr. Evans) Was it installed with the pressure washer ahead?

A. (Mr. Armstrong) No. The pressure washer was in the last position, the third stage.

Q. (Mr. Evans) As I understand it, we will get a report of the results obtained?

A. (Mr. Armstrong) If the customer makes that available, it will be published, yes. We can't disclose information without permission of the customer. I don't see any particular problem here, however. It will undoubtedly be published.

Q. (Mr. Evans) Let me ask one other question. Did you wash countercurrently, or did you take the filtrate from the press and mix it with the dilution from your washer?

A. (Mr. Armstrong) No. It's a straight countercurrent proposition. The fresh wash water is added in the last stage in the press. That has a hollow spindle. The wash water is pumped under pressure through the spindle, outlets are provided near the bottom, where the pulp is at a consistency of about 33 per cent. It passes through the pulp, comes out into the water basin and flows into a tank for removal of the air and foam, and then is pumped to the showers on the vacuum washer. It is a straight countercurrent system. This is what we call three stages.

Q. (Mr. Evans) Was it countercurrent when you had the press ahead?

A. (Mr. Armstrong) There was no actual commercial installation with the press ahead. That has all been done on an experimental basis.

Q. (Mr. Evans) That was what I was trying to get at. You had some figures in your paper that showed that it was far superior with the press behind. But, it wasn't a comparison on actual mill installations?

A. (Mr. Armstrong) No. That is from the theory which we presented. The value of the theoretical calculation is that you avoid the terriffic expense and time of trying these things out on a big enough scale to be reliable. You cannot do it on a laboratory scale. It has to be done on at least a 25-ton operation to get reliable figures on it. A 300-ton installation would be far too expensive to answer all these questions. I think that is the chief value of my paper in that it can be predicted very accurately, mathematically, without actually making the installation at all. But, we make the actual installation later; and prove that the theory was correct.

(Mr. Evans) If you press ahead, certainly you would not have as much foam as when a press isn't used. With vacuum washers in the second stage there is considerable trouble with foam. When you reach the third stage, the air is well removed and it sheets up and washes more efficiently.

(Mr. Armstrong) We find that the first stage always has the highest dilution ratio. The second stage always has the poorest. The third stage improves again but never gets quite as good as the first stage. It is a little hard to explain in a plausible manner. We offered one explanation in the paper. You might feel that that is the correct answer.

Q. (Dr. A. W. J. Dyck, The PAPER INDUSTRY) I am referring to the salt cake figures in Table III of Mr. Armstrong's paper. In the case of the screw press, the figure was 70. In the case where the screw press preceded the vacuum washers, it was 106. Then, in the last column, under the screw press, it was 111. Does this mean that the screw press was more efficient than the combination of screw press and vacuum washers?

A. (Mr. Armstrong) That figure of 70-lb. salt cake loss refers to a single stage of pressing. The figure of 111 was a type of press in which they did no displacement washing at all—depended on squeezing the pulp only,

without dilution, recovering a very high concentration of effluent. As a consequence of no dilution, you get a dirtier pulp, but you also get a very much higher concentration of solids in the evaporator feed. Which type of press or combination of them should be used are local problems that you would have to sit down and work out. That is the chief reason why I prepared the data for this paper. It was my job to go into the mill to study and make recommendations of the best system. There is no answer to every mill. Each one has to be studied. You may be short of evaporator capacity. You may be shy on steam for the evaporator. There are a lot of local conditions that have to be taken into account before you can make a logical recommendation. The combination of press and washer on the other comparison was to answer the question of whether to put the press before the washer system or to put it behind. I would not say that one machine was more efficient than the other. The press usually shows up, although not invariably, better than the vacuum washer by virtue of the small amount of liquor in the washed pulp. Concentration of liquor may be the same, or the vacuum washer may be at a lower concentration, but there is more of it per ton. It is a function of consistency then, that is, the output consistency. If you are coming out at say 18 or 20 per cent on the vacuum washer, which is about as high as normal practice will go, you can't hope to compare with a press that is putting out 40 per cent or higher. This is an inherent advantage of the press. I tried to write this paper so that it was not exploiting one at the expense of the other. I think in all of this each has its own particular field. As I said before, a local study of a particular mill's requirements is the only way to answer the questions, "Which type will I put in; and whose is the best?" There is no answer to that in a general way at all. Different mills will select different types of equipment and different manufacturers because they have a particular advantage for their special problem.

Fiber losses

Q. (Mr. Roy L. Miller, St. Regis Paper Co.) I would like to ask a specific question of Ed Kemp and Bill Converse regarding the loss of fiber in screw press washing. How much fiber goes out with the liquor? My personal observation is limited to screw press thickening of groundwood, in which the loss of fiber was rather impressive. Then, I would like to throw out the general question of what can be done to close up any washing system to minimize the loss of fiber into the final effluent from that washing system.

A. (Edwin Kemp, The Bauer Bros. Co.) The amount of fiber loss seems to depend on the hardness of the cook. For steam cooks and high-yield semichemical cooks there is not as much fiber loss as in a high-yield sulfite cook or in a kraft pulp. In some cases, that loss of fiber can be reduced, where you have a countercurrent system, by running the pressed liquor from the second stage back into the chips ahead of the first press. You can recover the fiber from the second stage because it just keeps recycling. In some cases, you accept it as a loss, if it is not too much.

A. (C. W. Converse, Sprout, Waldron & Co. Inc.) I think another factor that determines the amount of fiber loss is the incoming consistency to the press. In saying that, I am not thinking of chips. If you are coming in with fiber, there is always a certain loss of fibers through the slots in the barrel. However, I believe that that fiber should be considered as recoverable. As a matter of fact, if you're pressing the liquor from semichemical chips and that liquor is subsequently to be evaporated and burned, you are going to have to get that fiber out to prevent scaling of the evaporators. Taking it out doesn't seem to be any great problem because it is rather small in amount; and the actual volume of liquor, since the liquor is concentrated and undiluted, is small. Therefore, a small piece of equipment can handle it. The most important single factor is the spacing between the barrel bars. However, that is easily adjusted to the conditions in any installation. I think the prime factor, at least in our experience, has been the incoming consistency. Sometimes, raising a consistency by a rather small amount will almost completely eliminate the loss of fiber through the barrel bar slots.

Q. (Mr. Miller) I also asked for comments in general from any source on how to minimize the amount of fiber either lost to the stream in some systems or carried with the black liquor back to the evaporators in other systems.

A. (W. G. Dedert, Swenson Evaporator Co.) This has become a pretty important subject, of course, as we use more and more hardwoods. As a guide, referring back to kraft evaporators, it has been our experience that, if the fiber content in the liquor going to the black liquor evaporator exceeds about 15 lb. per million gallons of liquor, we can anticipate some difficulty in the evaporators, Now this will vary from place to place. I know many of you will have values of 100. I can also say that some of you have found that if you do not get down to 15 you have trouble. Again, referring to our equipment, that is rotary vacuum filters, another thing which has increased the difficulty has been a tendency to use wider mesh wire on rotary vacuum filters. Our company still is using roughly a 40 x 50 mesh wire. We still do this because we do not use press rolls, for one thing. The use of press rolls more or less encourages the use of a stronger wire; and there have been many cases, I believe, of the use of 12 x 18 mesh wire. The opening itself is bigger, in that case, which of course will increase fiber loss into the liquor. To go a little bit further, there have been three or four different ways tried, and many of them successful, I guess, to take some of that fiber out of the liquor. It is not always a very easy job. One piece of equipment used is the Impco-Waco filter. I am not going to judge on the effectiveness of these things. A side-hill screen has been used, which is nothing but an inclined wire usually around 100 mesh. I have seen that used successfully. Another is the Malone filter, or the Smeltzer filter, I guess it's also called. It's just a small cylinder, wire-bound. I don't really think that this is an easy job. I think that it is frequently difficult to get down to a low enough fiber content in the liquor to avoid some fouling in the evaporators. We believe that we may need a better piece of equipment to do that because we're going to have more and more trouble with it.

A. (Dr. W. J. Nolan, University of Florida) Back in 1940, I was in a soda mill in northern Maine. They had a very severe problem with pulp in the black liquor—it was shutting down their evaporators too often. They installed a Vallez Continuous Rotary pressure filter. Their liquor was at such a high temperature they did not want to use an atmospheric filter and suffer the consequent loss of heat. So, they used a Vallez Continuous Rotary pressure filter with a conveyor through the bottom. This conveyor discharge for sludge was operated only intermittently. At that time, the installation was satisfactory; but that may be old stuff now, I don't know.

Bowaters Southern

(Continued from page 120)

power applied to each drum. Starting, stopping, jogging and speed control are all accomplished by a single handwheel type controller.

Power and steam

As a result of the installation of the third paper machine and auxiliary equipment, electrical demands at Bowaters rose from 50,000 kw to approximately 80,000 kw. Currently, two turbo-generators are supplying about 20,000 kw of this total demand, while the balance is furnished from a Tennessee Valley Authority sub-station. The installation of a new turbine and a 32,000-kva hydrogen-cooled generator is to be completed this summer.

The turbine is a condensing single automatic extraction unit rated at 25,000 kw, with design initial steam conditions of 850 psi at 900° F and operating at exhaust pressure of 2 in. Hg. It is designed for controlling extraction steam pressure at 50 psi.

A new boiler supplies 350,000 lb. steam per hour at 850 psi and 900° F. While primarily designed to burn natural gas, the boiler is also equipped to burn fuel oil.

With the new boiler, total steam generation capacity has increased to approximately 900,000 lb. steam per hour.

The original steam generating equipment included two gas-fired power boilers rated at 150,000 lb. steam per hour, a bark boiler rated at 125,000 lb. steam per hour and a recovery boiler producing 123,200 lb. steam per hour.

Packaging's impact

(Continued from page 123)

Organosols and plastisols constitute a different type of emulsions. An organosol is a dispersion of the resin in a plasticizer and a non-solvent, while a plastisol is a dispersion of a resin in a non-solvent plasticizer. These dispersions require higher temperatures to form a continuous coating on paper. Surface coatings have good abrasion resistance and flexibility because of the higher-molecular-weight resins usually used in these dispersions.

Extrusion coatings have made a real impact on packaging, making possible the use of thin films of materials on the surface of paper to extend unit packaging into many new fields. Polyethylene and polyvinylidene chloride (Saran) are the principal materials currently used for extrusion coating. Polyamide resins offer promise in this field also. Polyethylene-coated kraft paper, both unbleached and bleached, is used extensively in the manufacture of small bags, box and carton liners, lockerwrap, multiwall shipping sacks, single ply bags, specialty bags, case liners, and linerboards for corrugated and solid fiberboard containers. A polyethylene coating improves the resistance of glassine to grease and oil. This combination is found in bags-within-cartons, carton liners, bag liners and other forms. Polyethylene-coated tissue paper finds application in disposable diapers, bibs and expendable bed sheets. Polyethylene is crease resistant, flexible from −65° F to 200° F, is smooth and free of tackiness. Powders and metal parts do not stick to it. The film possessses puncture-resistance and resiliency. Polyethylene-coated paperboard is a relatively new development in the packaging industry. A combination of grease and moisture resistance in these papers, which are not appreciably impaired by creasing or folding, can be used to advantage in many packages.

Technical manpower

(Continued from page 129)

As far as the university is concerned, the young man would be a full-time student in good standing as long as he registers for at least 12 hours a semester and maintains satisfactory grades. The company will pay the student directly for the number of hours put in at the Pulp and Paper Laboratory. There should be an informal arrangement between the company and the laboratory to insure that there is room for the incoming man in the program and a continuing contact so that the mill will be informed of the student's progress. It should be possible for the mill to discontinue employment of a student in the program whenever his grades or his laboratory work fall below the desired standard.

This program will be of no particular advantage to the laboratory other than as a contribution to the progress of the industry. These students will require considerable supervision, and they must be transferred from one job to another as soon as they have acquired sufficient training in any particular routine. In other words, as soon as they have reached the point in any one job where their proficiency would make them valuable to the laboratory as technicians, they must be transferred to a new job and be retrained.

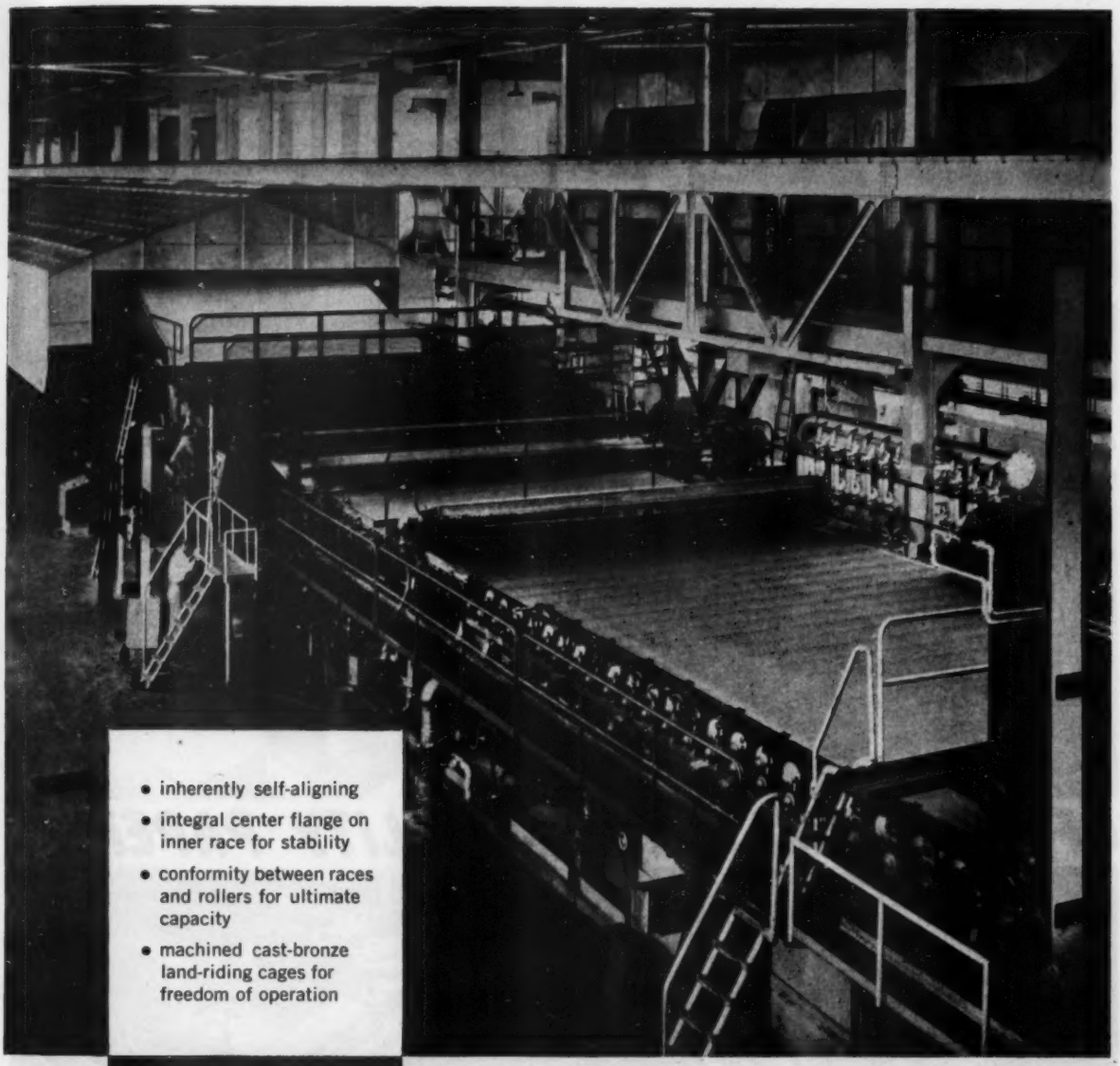
It is felt that this type of program will be no more costly than the co-op plan, as far as industry is concerned. In this plan the student is paid for half-time work for the full year, while in the co-op he is paid for a half year at full time. The pay scale will probably be less in this new full-time program than in the co-op. Whether or not the mill pays the student's tuition fees in this program would be a matter to be worked out between the mill and the student.

Some basic advantages of the program

If put into operation, this plan should supply the mills with a continuing supply of well trained chemical engineers. Each graduate will have completed the full curriculum of 146 credit hours, with no omission of the fundamentals to make room for specialized pulp and paper courses. Through his laboratory training he will have acquired a more thorough knowledge of the important phases of pulp manufacture than would be acquired in two years of mill experience after graduation. He will have developed research skills which would have to be acquired in further training subsequent to graduation.

The nature of the program is such that there should be a higher probability than usual that the graduate will remain with the sponsoring company. The fact that the mill site is located in the student's home town increases the probability that he will marry and settle down there. His feeling of gratitude to the sponsoring company should be greater than that developed by the scholarship or the co-op systems. In the co-op, the student is apt to feel that he is fully earning his salary and, therefore, has no obligation to the company. The scholarship, as mentioned earlier, is too impersonal to develop strong ties. On the other hand, as the student is paid directly for his laboratory work he knows that he is making no direct contribution to the company. Rather, it is quite apparent that the company is investing in his future.

There is one final advantage of this plan which should at least keep the graduate in the industry, even if he does not remain with the sponsoring company. He will realize that he has an expert knowledge of the industry not possessed by other graduates and, therefore, has an advantage in this particular industry. Second, his training should develop in him the fascination with the problems, even the odors, which are so characteristic of our indusrty, a fascination which most of us here have acquired.



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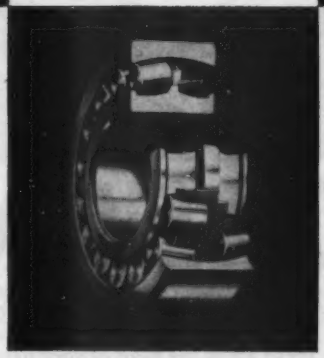
- integral center flange on inner race for stability
- conformity between races and rollers for ultimate capacity
- machined cast-bronze land-riding cages for freedom of operation



A New World's Record!

World's record on 50# Kraft bag paper—2,200 fpm—is held by this 232-inch paper machine built by Beloit Iron Works for St. Regis Paper Company at Jacksonville, Florida.

Contributing to this performance are 718 Torrington Spherical Roller Bearings on wire rolls, press felt rolls, top press rolls, paper and felt driers and idlers, calenders, suction couch and press rolls, reels and winders. Inherently self-aligning, these bearings compensate for shaft deflection across the machine and eliminate need for periodic realignment.

Torrington Spherical Roller Bearings are available from stock with straight or tapered bores for shaft or adapter mounting. When you are counting on production, count on Torrington Spherical Roller Bearings for smoother, faster, more economical service from wet end to winder. *The Torrington Company,* South Bend 21, Ind.—and Torrington, Conn.

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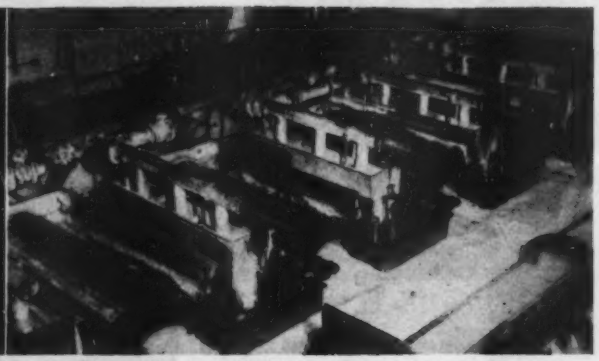

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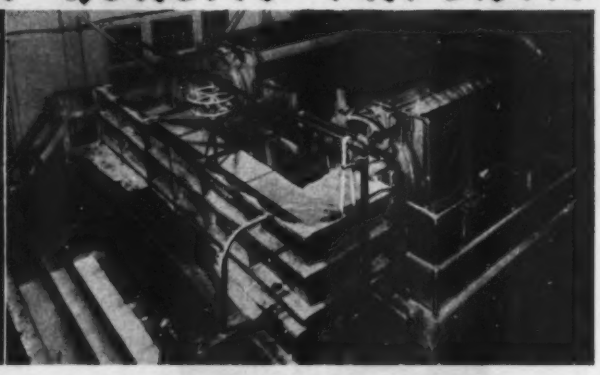

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CURRENT COMMENTS

Background threat of inflation . . . an end to the dullness . . . and exports

by WARREN B. BULLOCK

Appropriations for expansion on the one hand and cut-backs in expansion plans on the other were the cross-currents of April. The picture in the paper industry is further complicated by a background threat of inflation. Sensitive as the industry is to economic developments, its leaders are by no means moving in identical directions.

Chairman of the Board John H. Hinman of International Paper Co. has announced to company stockholders that investments in 1956 totaled more than $100,000,000 in plants and properties and an additional $36,000,000 in woodlands. He told of plans for a further investment in 1957 of $100,000,000 in new facilities, improvements and acquisition of woodlands. Eventual expansion into the Pacific Coast region is under engineering study.

On the other side of the picture, it has been reported by Hudson Pulp & Paper Corp. that it has abandoned its plans for newsprint production in the South; and West Virginia Pulp & Paper Co. has temporarily shelved a $50,000,000 projected expansion.

Alexander Calder of Union Bag-Camp Paper Corp. told the annual stockholders meeting on April 9 that the pressure of competition would reduce the company's income by about 30c a share during 1957, but that the firm is still planning the expenditure this year of $30,000,000 in expansion. It was his opinion that the earnings of the paper industry in general will be somewhat lower during 1957 than during 1956.

On a gigantic scale

Mergers on a gigantic scale are being completed. One of the most extensive moves in this direction is the absorption into the Weyerhaeuser empire of Eddy Paper Corp. and Kieckhefer Container Co. — a project listed as involving more than $180,000,000. Weyerhaeuser, originally known best for its West Coast lumber interests, has gradually shifted to pulp as a side line, with some lesser subsidiaries in the paper field. The new enterprise, however, puts the company into the paperboard field in far more than a small way. Stockholders were to vote in April on the actions. (The $180,000,000 figure is based on the proposal to give Eddy and Kieckhefer stockholders a total of 5,000,000 shares of Weyerhaeuser stock at the value quoted in the New York over-the-counter market.)

And this was not the only important merger news of recent weeks. Diamond Match Co. is going far afield in acquiring Gardner Board & Carton Co. of Middletown, Ohio, a firm with 1956 sales of $170,000,000. Diamond Match has an enviable record as an investment enterprise, boasting one of the longest dividend-paying records in United States industrial history.

Inflation or growth?

General sentiment seems to be that the dullness in the paper field is reaching its end, and that the upward trend in consumption will be resumed before the beginning of the third quarter. Whether this will be due to inflation or to a normal industry growth is still a matter of question. (The possible inflationary trend of the proposed $72,000,000,000 federal budget cannot be overlooked.)

While paper industry leaders are questioning, "Where do we go from here?" the rest of the world is moving forward in economic development to an extent that cannot fail to have some adverse effect on American export markets. The extent to which paper mills are being built abroad — in Latin America, the Orient and elsewhere — will curtail the demand for purchases from the United States to the degree that the new mills can supply their domestic consumption requirements.

American money is involved in many of these expansions. An agreement covering a $9,000,000 expansion of American-Israeli Paper Mills Ltd. at Hadera, Israel, has been reported by Israeli representatives in this country. The mill now supplies 40 per cent of Israel's requirements in the paper field with a saving of $1,000,000 annually in foreign exchange, and the proposed expansion is expected to save an additional $3,000,000.

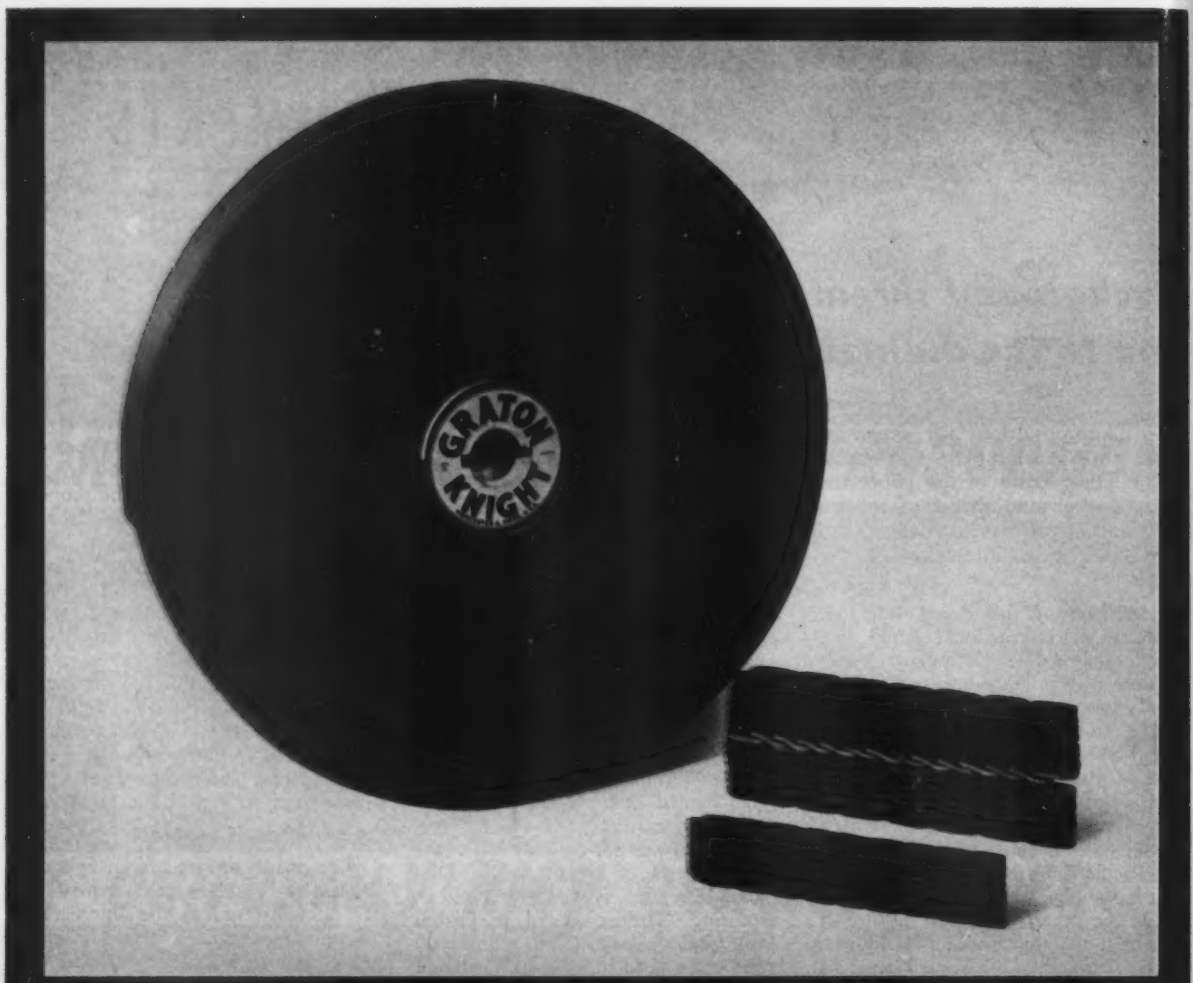
The construction by W. R. Grace & Co. of a pulp and paper mill in Puerto Rico at a cost of $8,000,000 means an expanded utilization of bagasse for paperboards and coarse papers in general. This is in addition to the acquisition by Grace of the old Puerto Rico Container Corp., which previously marketed its products through a U. S. sales agency. The two concerns will be integrated into a single agency.

A sacrifice of control?

Congress is to face a bitter fight over President Eisenhower's request for U. S. adherence to the International Trade Organization. The administration sees such action as facilitating equitable world-wide tariff practices, while the opponents — now largely conservative Democrats and old-line Republicans — view with alarm a proposal that they believe sacrifices American control of its tariff system to an international agency.

Closely related to the tariff problem is the recent action to establish a European common market with free trade between members. This action raises the question as to whether the agreement between participating nations to exchange goods and services without tariff barriers will automatically place the United States on the outside looking in, with its products subject to higher rates of duty than those of the participants. A nuclear pool is part of the project for the European economic community. But, the tariff problem is of most importance to the United States — especially to its exporting industries. (The participating nations are Belgium, France, Italy, Luxembourg, the Netherlands and West Germany.)

Tariffs are to be progressively reduced in three stages of four years each, finalization to be accomplished by the end of the 12-year period.



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Current Comments . . .

Wages for men and women are to be equal, and in general labor conditions in all countries are to be placed on a common plane.

Minor incident of major proportions

A comparatively minor incident of recent date demonstrates the extent to which the paper industry is taking over markets formerly controlled by textiles and lumber. An eastern operator specializing in the marketing of cotton bagging stock for sugar, flour and similar commodities is virtually out of business. His market has been captured by multiwall paper shipping sacks.

Campaigns sponsored by U. S. industry groups promoting the more efficient and broader use of paper and paperboards are once again proving of value. An example: the development of special paper shipping containers to meet the requirements of various perishable products in such fields as citrus fruits and vegetables.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	April 10, 1957	March 11, 1957
Celotex	34	33⅜
Same Pref.	*18¾-19	18¾
Certain-Teed	10⅜	10⅝
Champion P & F	35½	36½
Same Pref.	97	97
Chesapeake Corp.	26¼	27¾
Container Corp.	20⅜	18⅝
Same Pref.	*90-92	87½
Crown Zellerbach	53¼	51⅜
Same Pref.	*98-98½	96¾
Dixie Cup.	63	57½
Eastern Corp.	29¼	27¼
Federal Paper Board	34¼	32½
Same Pref.	*19-19½	19⅝
Fibre Paperboard	29¼	30⅝
Same Pref.	101	103½
Great Northern	*83-84	*83½-83¾
Hammermill	35	36
International	99⅜	99⅞
Same Pref.	94½	*94-96½
Kimberly-Clark	45⅜	43⅞
McAndrews & Forbes	36½	*36-37½
Marathon	27½	28
Masonite	29	*29½-30½
Mead Corp.	35⅝	36
Same Pref.	*90-92½	*89-90
Minnesota & Ontario	35¼	36¾
Oxford Paper	41¼	41¼
Same Pref.	*92-94½	*95-97
Rayonier	28⅜	28⅜
Riegel	27½	29½
Scott	59½	61
Same $3.40 Pref.	83	*84½-87½
Same $4 Pref.	96½	—
St. Regis Paper	39⅜	41¾
Same Pref.	*94-95½	*93⅜-95½
Sutherland Paper	36⅜	37⅜
Union Bag-Camp	33	33⅞
United B & C	24⅜	34⅛
United Wallpaper	7	6⅝
Same Pref.	*14½-15½	*14-14½
U. S. Gypsum	55	54½
Same Pref.	*160-162⅓	*158-163
West Va. P & P	41	43
Same Pref.	*103-105	104

New York Stock Exchange — Bonds

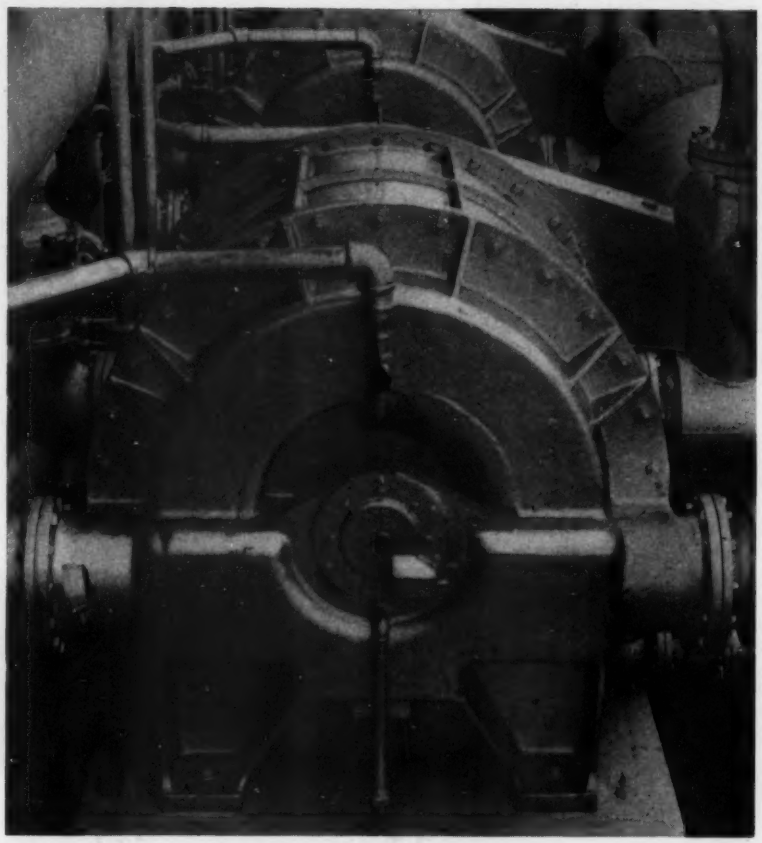
Champion P & F 3¾%	97½	96
Champion P & F 3%	91¾	91¾
Mead Corp. 3%	92¼	93
Scott Paper 3%	98¾	97½

American Stock Exchange — Stocks

American Writing	23	23
Brown Company	16⅛	15⅞
Puget Sound	16¼	16¼

*Closing Bid and Asked Prices.

High machine speeds?
High temperature headbox stock?
You need NASH Vacuum Pumps!



Air from the suction rolls on paper machines carries with it substantial quantities of moisture. This considerably reduces the effective air handling capacity of any vacuum pump except the Nash. In the Nash Vacuum Pump, because of the unique principle of operation, the bulk of this vapor is effectively condensed inside the pump. The total capacity of a Nash is therefore increased.

When you specify a Nash Pump it can be closely sized to the job. It is not necessary to select an over-sized unit, because the rated capacity of the Nash may be relied upon.

That is one of the reasons why Nash Vacuum Pumps are installed in over a thousand leading Paper Mills. An engineer from Nash will be glad to survey your mill, and make recommendations, entirely without obligation to you.

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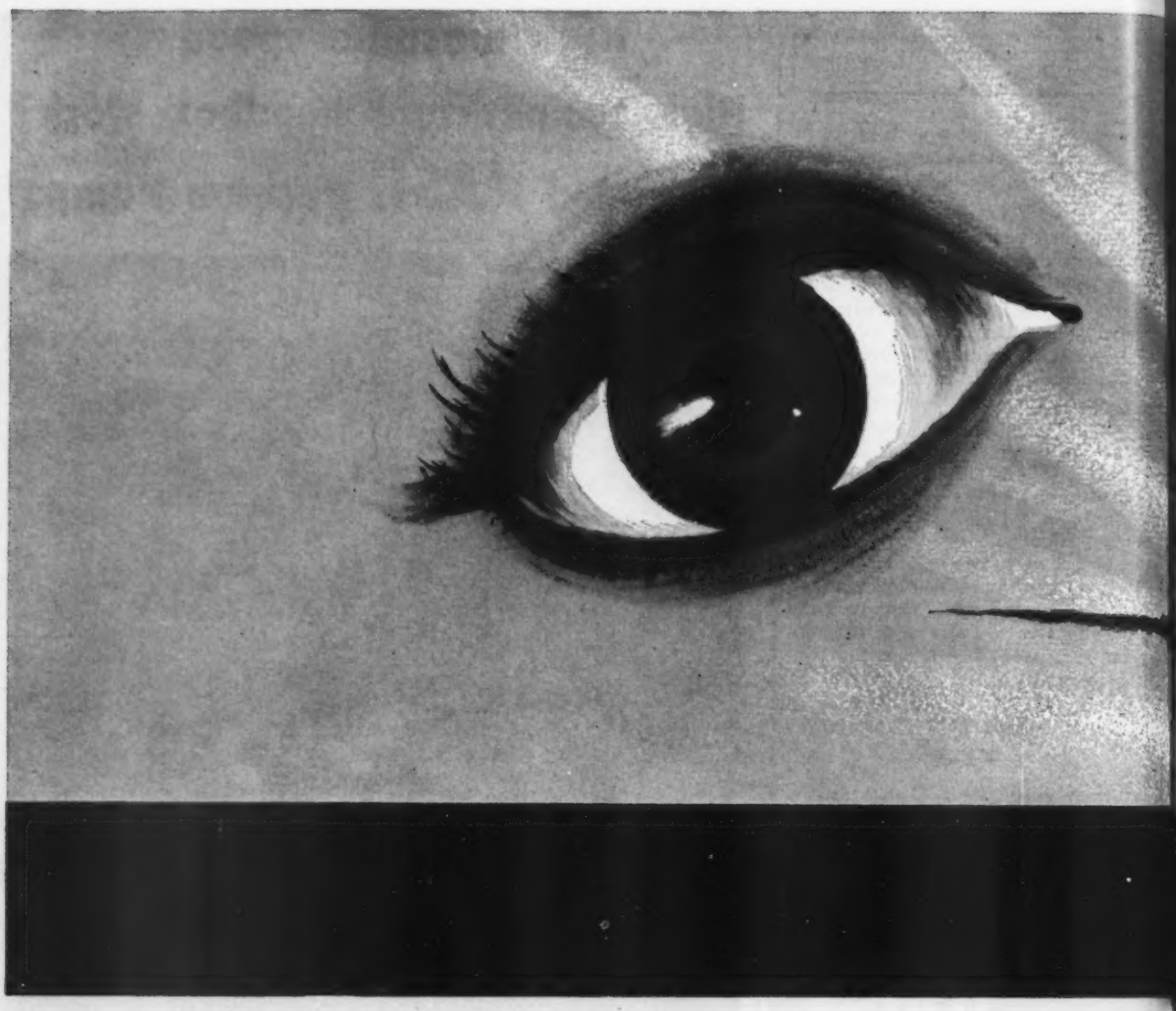

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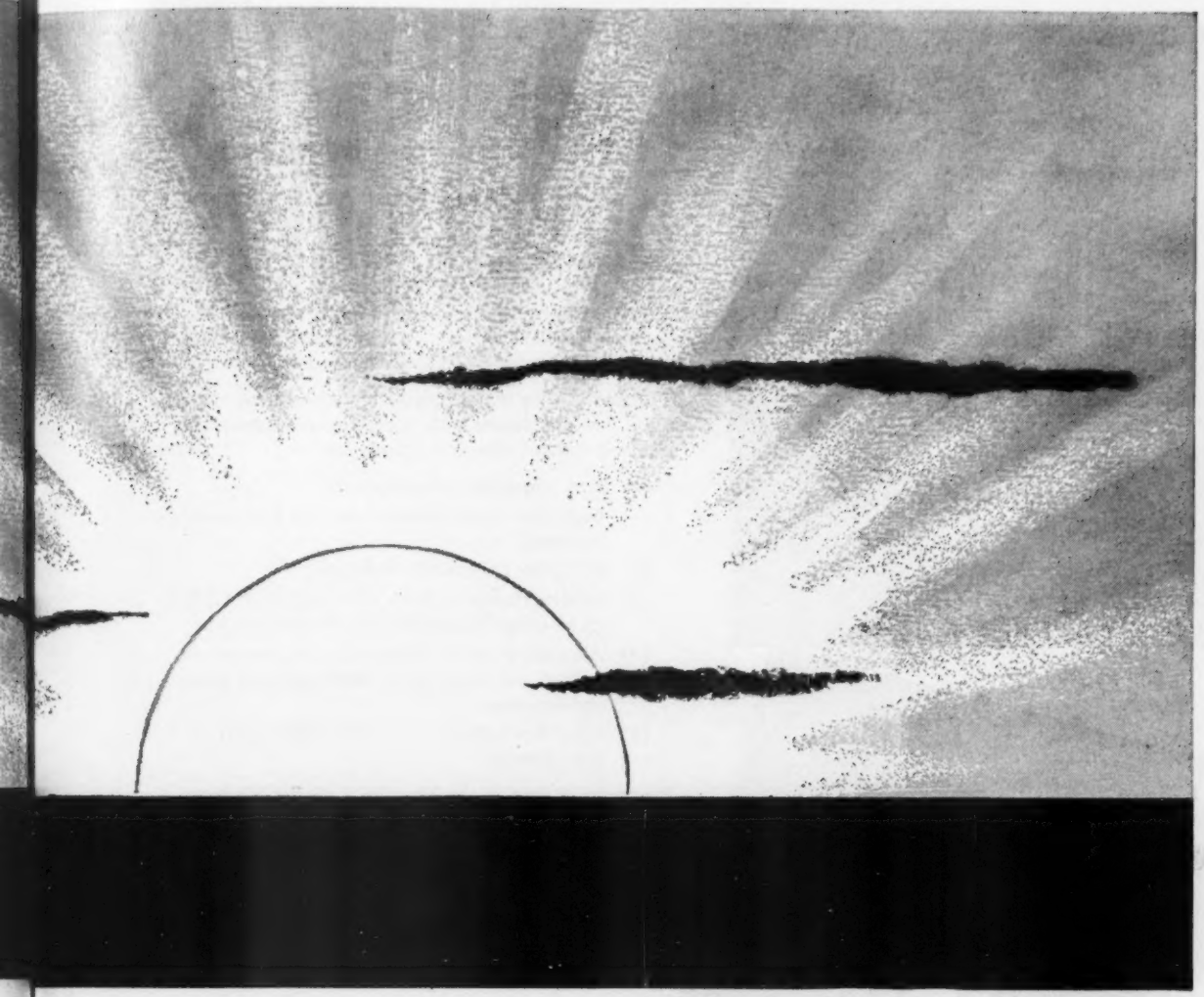
The Lightest Rosin

. . . and what they can

Claims are fine . . . but seeing for yourself is conclusive proof. Let your Cyanamid representative show you samples of the lightest rosin sizes available to paper makers. Estimate for yourself what these Cyanamid sizes can mean in terms of new whiteness and brightness in your paper.

There's no premium on this new size quality. You simply benefit from Cyanamid's recent product innovations. This means you can produce better papers with no increase in cost—or save on your whitening agents while maintaining present paper standards.

Actual samples of these tall oil rosin, gum rosin and pale wood rosin sizes—both straight and fortified—will show you immediately how much more value your sizing dollar can buy. Call in a Cyanamid Paper Chemicals representative and have him put the facts on *your* desk.



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do for the brightness of your papers

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Your problems, and those of the entire paper industry, are the sole concern of Cyanamid's Paper Chemicals Department. Its success in meeting this challenge is evidenced by the Cyanamid line of paper chemicals—the largest in both volume and variety available from any manufacturer.

There are benefits for you in this specialized experience and these specialized products. A Cyanamid Paper Chemicals representative can suggest how *specific* Cyanamid products can aid in your paper production, or improve your paper quality.

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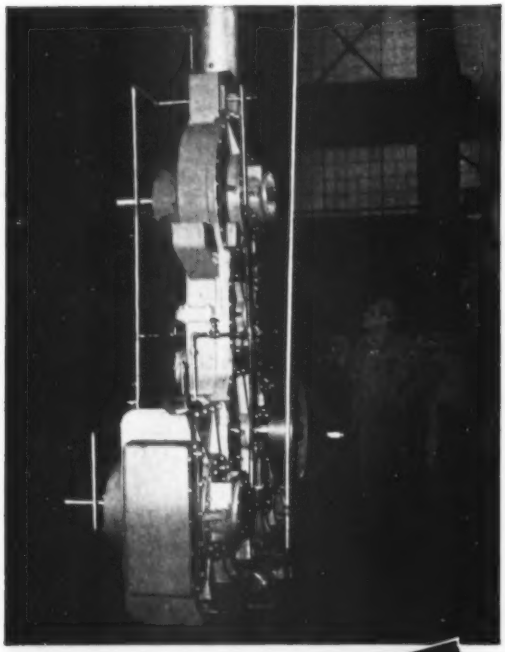

HIGH-SPEED DRYER DRIVE

Here is the latest high-speed drive for the dryer section — smooth flowing power . . . setting new production records on the latest Puseyjones Machines.

Operated in shop test at equivalent paper speeds up to 4,000 feet per minute with minimum oil temperature rise, and without vibration or back-lash.

Check these important improvements:

(1) Each idler gear supported by two heavy-duty bearings;

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(3) Interior channelways for delivering oil direct to each idler gear from the main circulating system;

(4) All outside cover plates may be removed in sections for convenience when replacing gears and bearings;

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For the latest Fourdrinier Machine, Cylinder Machine, Yankee Machine or a modification of any of these types, talk to Puseyjones.

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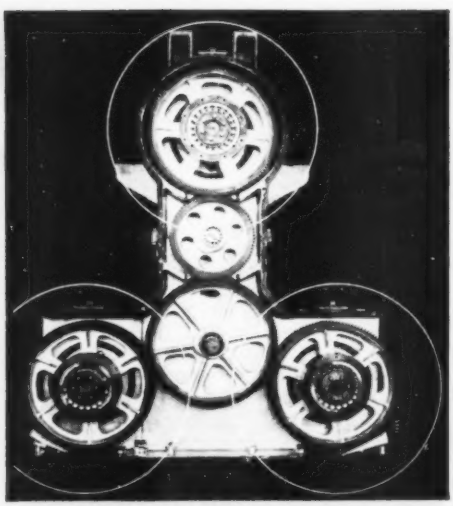

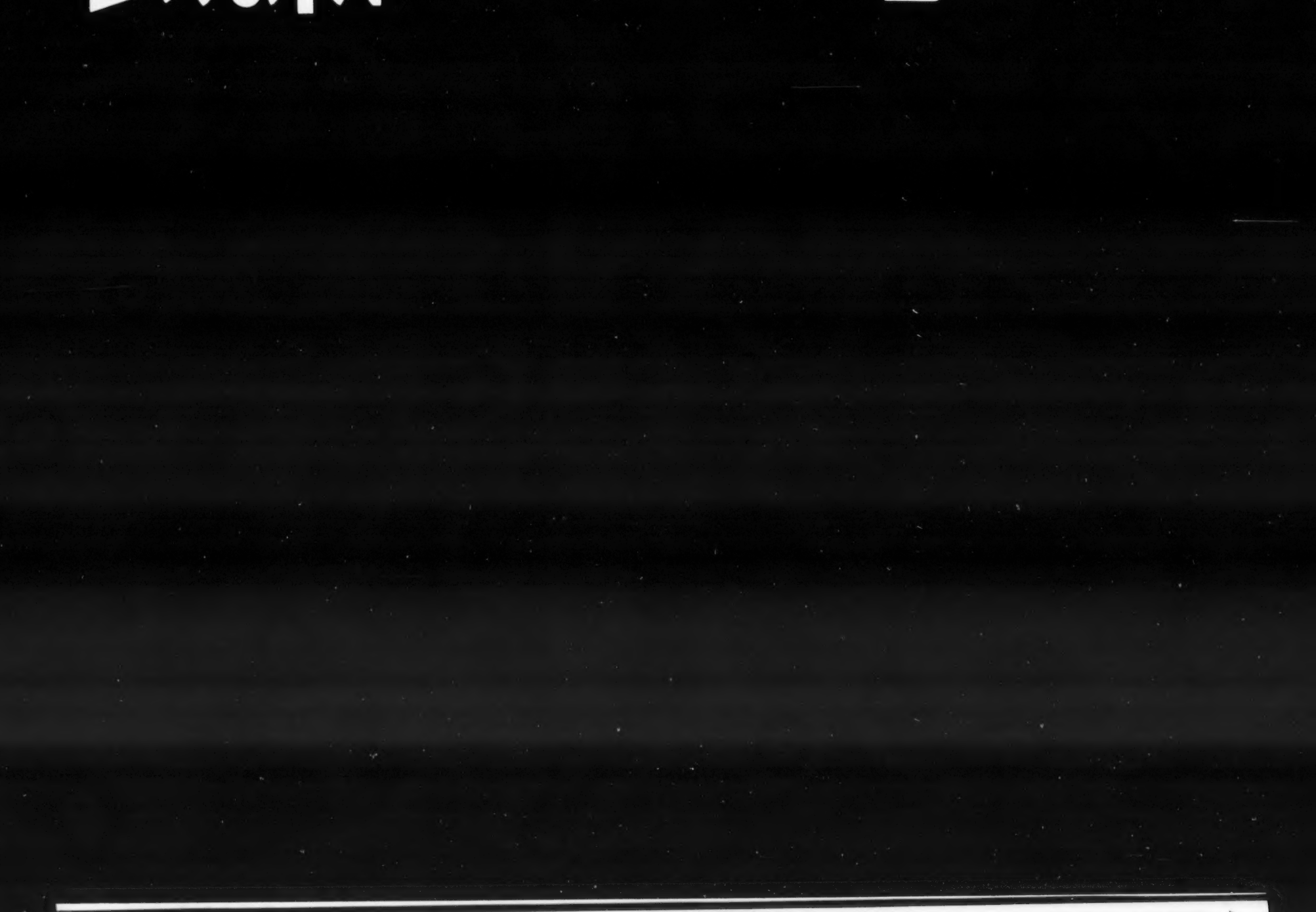

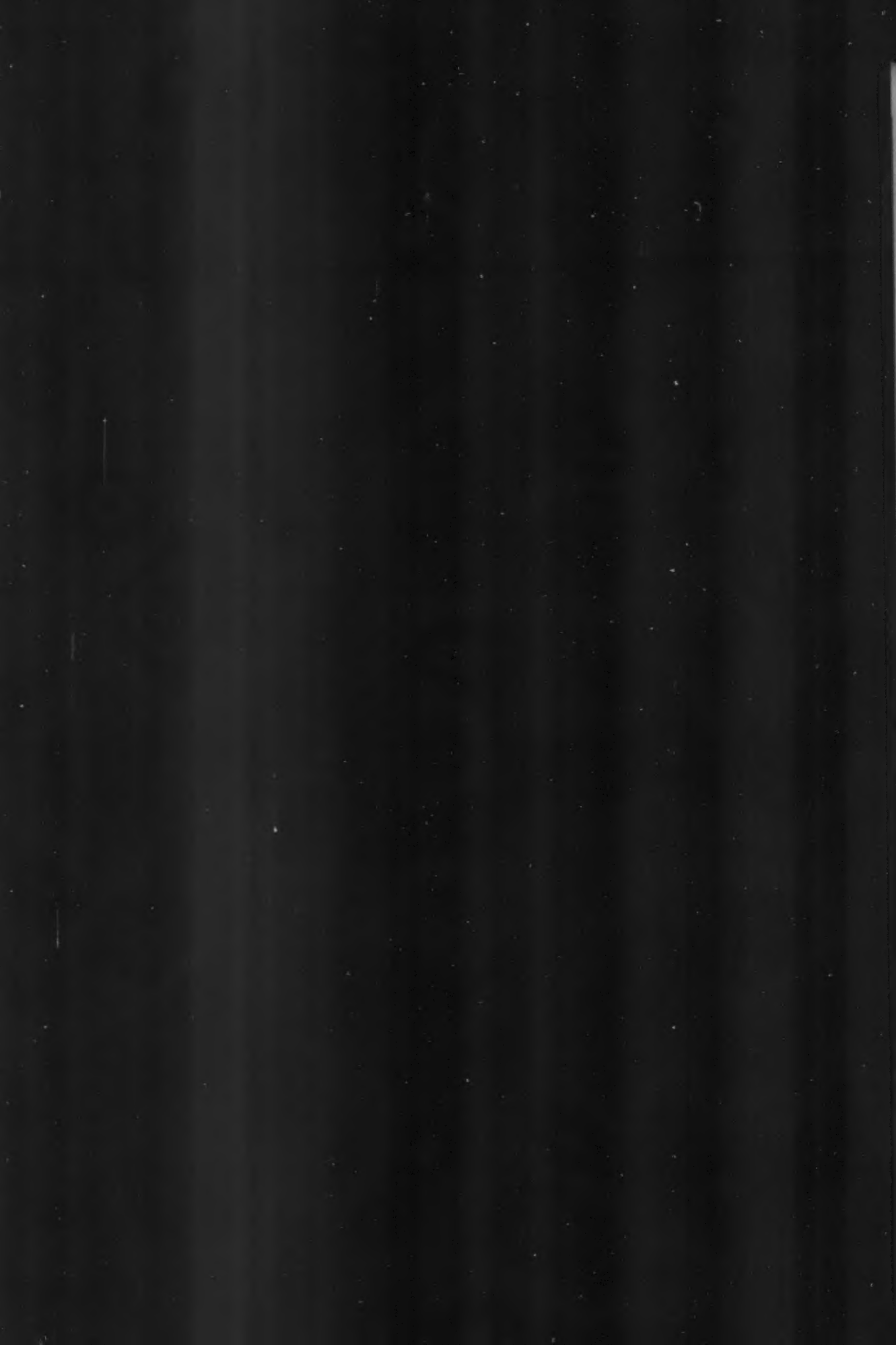

NEWS of the INDUSTRY

APPA Statistics Show Industry Growth Since 1947 in United States

RECENT FIGURES released by the American Paper & Pulp Association show the growth of the paper and board industry between 1947 and 1954. Although the number of mills decreased by 2 per cent in the period, production showed a gain of 27 per cent.

In 1947 no less than 80 per cent of the total number of establishments was located in the northeastern and north central states and accounted for 65 per cent of production; while in 1954 the number of establishments in these states had dropped to 75 per cent of the total and accounted for only 52 per cent of output. The average annual production per mill in the two northern regions rose from 24,000 to 28,000 tons during the seven-year period as the number of plants decreased by 54.

Over the years involved in the study, the average annual production per establishment in the South increased from 62,000 to 85,000 tons, while the number of plants was up from 96 to 117. And in the West production per mill per year advanced from 42,000 to 53,000 tons. The number of plants rose from 41 to 55.

Data for man-hours and for wages of production employees per ton indicate that the older producing regions—where output consists largely of printing, writing and specialty papers—experienced relatively small increases in productivity over the seven years. Although the data used for this purpose are not strictly comparable due to changes in product-mix, the northeastern and north central states showed a gain of only 1 per cent in productivity and the east north central region a gain of 11 per cent. The south Atlantic states, on the other hand, registered an advance of 37 per cent, the West 26 per cent and the south central 19 per cent.

Comparative Paper and Board Mill Statistics — 1947 thru 1954

	1954	1947	% Change
Number of Establishments	680	695	− 2
Production (million tons)	26.9	21.1	+27
Average Value per Ton* (dollars)	152	133	+14
Cost of Materials (million dollars)	2513	1761.9	+43
Average Material Cost per Ton (dollars)	93.4	83.5	+12
All Employment (thousands)	158.5	147.6	+ 7
Salaries and Wages (million dollars)	718.3	459.6	+56
Production Employees (thousands)	134.2	128.3	+ 5
Wages (million dollars)	570.6	361.7	+58
Wages per Ton (dollars)	21.21	17.14	+24
Man-hours, Production Workers (million hours)	296.3	281.7	+ 5
Man-hours per Ton	11.0	13.4	−18

*Includes market shipments and interplant transfers.

Temporary Dip: More Prosperous Future, Luke Tells Stockholders

The sobering influence of the temporary dip being experienced by the paper industry—combined with the cost-price squeeze and the tight money market—is braking overexpansion. The result: a more orderly preparation for a more prosperous future. This was the view expressed recently by David L. Luke Jr., president of West Virginia Pulp & Paper Co., as he addressed the firm's annual meeting.

Luke noted that trend lines of the industry are strongly upward despite a current leveling off brought on largely by temporary overcapacity. He declared that it is likely that current expansion plans, which had indicated a capacity increase in North America of more than 35 per cent over a four-year period, probably would be stretched out over a longer period than originally announced.

The speaker pointed out, however, that some degree of excess capacity is likely to result from projects scheduled to come into production this year and next.

"This excess capacity," Luke continued, "is likely to have some adverse effects on the earnings of the industry. It is likely, at the least, to retard or prevent some upward adjustment in prices that is needed to absorb our higher costs. To the extent that it causes a reduced average rate of operations not offset by new efficiencies, it will raise unit costs further and thereby add to the cost-price squeeze."

Luke emphasized that there is no parallel between the current overcapacity and the excessive production that caused serious dislocations in the paper industry during the 19-20s and 1930s.

In light of probable surplus capacity, West Virginia Pulp & Paper will take advantage of opportunities to stretch out its capital improvements, both large and small, Luke declared. As an example, each of the two new paper machines that have been ordered for the Luke, Md. mill will be delayed by at least a year. Originally, the machines were scheduled to go into production in 1959 and 1960.

Weyerhaeuser Approves Eddy, Kieckhefer Merger

Shareholders of Weyerhaeuser Timber Co. have approved a proposal to merge Kieckhefer Container Co. and Eddy Paper Corp. into Weyerhaeuser.

The action was the first of three by shareholders of the respective companies. The merger was approved in principle by the boards of directors of the three companies last February.

Kieckhefer-Eddy facilities include 17 shipping container plants and 10 milk carton plants in 19 states scattered from the eastern seaboard to the Pacific Coast.

(Turn to page 143)

This revolutionary advance in Jordan plug design

SAVES TIME AND MONEY FOR YOU

This new completely bandless Jordan plug is easier to strip, easier to fill. Inverted wedge type slots hold bars firmly in place, eliminate dangers of slot wear and corrosion. Slots and woods remain the same regardless of bar design — fillings can be readily changed without changing the plug.

Adapta-Plug is also available in Meehanite sleeve form for old plugs; removable, if desired, for easy changeover. Ask your Jones representative about this newest, strongest, most adaptable Jordan plug design today . . . or write us direct for complete details.

Photo shows how bars are grouped in pairs and wedged firmly in slots.

Adapta-Plug

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OVER 300 OF THESE **FULBAR** Shell Fillings now in use

A complete one-piece assembly, made to fit into the shell body of any Jordan, the Fulbar needs no keys or wedges. The ideal filling for an old Jordan that has had shell wear, Fulbar rigidity and accurate one-piece construction readily compensate for inequalities which would make precise fitting of a sectional filling a problem. Users report savings of up to 12 man-hours in installation time. Easy to grind in, too — and no sharp ends on bars to form strings or lumps. There are many new advantages. We'll gladly send you full details and the names of satisfied users.

Pacific Coast Paper Puts New Machine in Operation

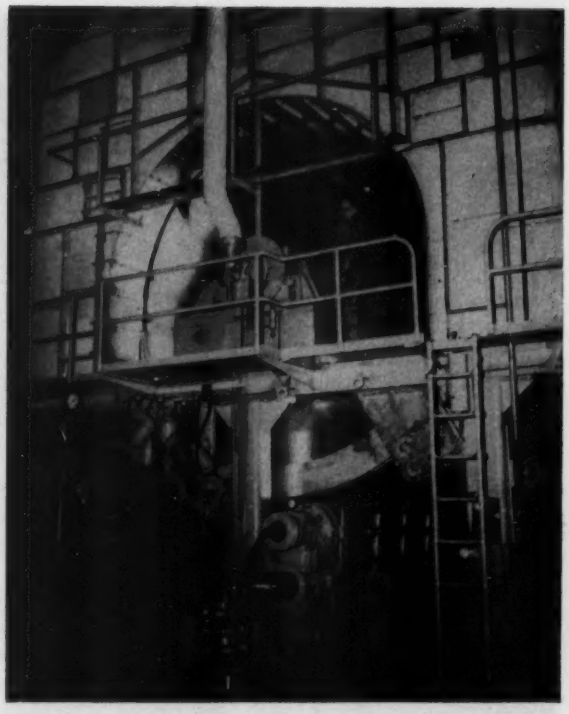
An $800,000 paper machine for the production of tissues has gone into operation at the Bellingham, Wash. mill of Pacific Coast Paper Mills of Washington Inc. The Beloit Iron Works unit adds 35 daily tons to the plant's output.

Over-all cost of the project was approximately $1,500,000.

The machine is engineered to produce dry crepe paper at a balanced rate of 3000 fpm. A feature of the Beloit giant is a Yankee dryer 16 ft. in diameter.

Major contractors and suppliers included: Howard S. Wright & Co. Inc. of Seattle, general contractors; Worthington & Skilling, Seattle structural engineers; Haskell Plumbing & Heating Co. of Bellingham; Mills Electric Co., also of Bellingham; Chemical Linings Inc., Watertown, N. Y.; Bird Machine Co., South Walpole, Mass.; Ross Midwest Fulton Corp., Dayton, Ohio; DeZurik Corp., Sartell, Minn., and Nash Engineering Co. of South Norwalk, Conn.

BIG ADDITION at the Bellingham mill of Pacific Coast Paper is this 16-ft. Yankee dryer on the $800,000 paper machine recently installed at the plant. Built in the East, the dryer was transported to Seattle by ship and then to Bellingham by barge.



Construction Begins on Ecusta's 10th Machine

Construction of the tenth paper machine at the Ecusta Paper Div. of Olin Mathieson Chemical Corp. in Pisgah Forest, N. C., is underway.

The new machine, which will initially produce Bible paper, thin publishing papers and carbon paper, is being built by Rice Barton Corp. Most of the stock preparation equipment will be furnished by E. D. Jones & Sons Co. Consulting engineering firm for the project is Chas. T. Main Inc. Start-up is expected in the spring of 1958.

March Sets Record in Newsprint Output

Production and shipments of newsprint in North America during March amounted to 738,658 tons and 687,754 tons respectively. The output figure represented an all-time monthly record.

United States production totaled 164,426 tons—largest monthly volume in history, and shipments were 161,221 tons. Canadian production amounted to the record March total of 574,232 tons and shipments to 526,533 tons.

The record 472,787 tons turned out by U.S. mills through the end of March was 53,893 tons (or 12.9 per cent) greater than that for the first three months of 1956. While the Canadian output of 1,651,725 tons also constituted a new high and was 60,837 tons (or 3.8 per cent) above that for the corresponding period a year ago. The continental increase thus amounted to 114,730 tons—or 5.7 per cent.

Extensive Wood-Handling Expansion Project Underway at Charmin

Construction has started on a new woodroom at the Division B plant of Charmin Paper Products Co. (formerly Charmin Paper Mills Inc.) at Green Bay, Wis. The structure is the first step in the development of a completely new wood-handling and processing system, exclusive of barking. (Charmin is a wholly owned subsidiary of Proctor & Gamble Co. of Cincinnati.)

The new building is located west of the sulfite mill and adjoining the existing steambarker building.

All equipment is either on order or received. The new Norman chipper, being supplied by Carthage Machine Co., will have a 22-in. spout making it possible to handle woods of larger diameter than at present. Powered by a 1000-hp motor, the unit has a 12-knife, 96-in. disc.

Ground-Level Chip Silos

A new log splitter, furnished by D. J. Murray Mfg. Co., will handle 8-ft. logs, splitting them into quarters. Present equipment requires the cutting of large logs into 2-ft. lengths for splitting.

Present chip bins in the upper section of the sulfite mill will be eliminated and replaced with four ground-level chip silos. One wing of the new U-shaped woodroom will house the silos, which are to consist of tile tanks 25 ft. high and with 25-ft. inside diameter set on reinforced concrete hoppers 35 ft. high.

Chips will be fed via a 54-in. rubber belt at the rate of 240 fpm. Digester filling will be by way of a conveyor system that is to extend through the area to be remodeled following removal of the present chip bins.

Conveying equipment is being supplied by Chain Belt Co., while chip screens are being furnished by Link-Belt Co.

Two new hot ponds will be constructed of reinforced concrete and will boast a 12,000-gpm water circulation system. One pond will feed peeled logs directly to the chipper conveyors, while the other will feed unpeeled logs to the steambarker. Rejects or crooked logs will be diverted to the existing drum barkers. Each pond will measure 12 by 8 by 120 ft.

A 1500-kva 13,800-v unit substation and electrical control center is to be furnished by Westinghouse Electric Corp.

(Turn to page 144)

SIZE PREPARATION system at Lock Haven boasts a master control and instrument panel (r), a 200-mesh Ty-Rocket vibrating screen (l) and a starch cooker and mixer (background).

New Surface Size Preparation System Supplies Four Machines at NY & Penn

NEW FACILITIES at the Lock Haven, Pa. mill of New York & Pennsylvania Co. simultaneously supply size to four fourdrinier machines. The equipment both mixes and automatically controls the supply of size to the surface size press-equipped paper machines.

The system is divided into four stages: mixing, cooking, screening and storage. Operation of each stage — as well as the flow between stages and to the machines — is controlled through a master instrument panel. Here, Minneapolis-Honeywell instruments regulate and record size mixing, cooking time and flow through the storage tanks and to the machines.

Maintenance is reported as practically unnecessary because of the extensive use of stainless steel and the automatic rinse mechanisms on the storage tanks. Man-power needs are likewise low due to the high degree of instrumentation and automatic control.

Air-Operated Valves

The process begins in the 1500-gal. starch mixer and cooker, where starch and water are cooked and mixed for 90 min. From the cooker the size is pumped through the succeeding screening stage, requiring about 30 min.

Mixer and cooker valves are air-operated Starr units that are actuated from the control panel. The valves are designed to close flush with the bottom of the tanks, thus insuring complete evacuation during discharge.

Following mixing and cooking, the size passes through a 200-mesh screen. Solid materials and size that may be only partially mixed are removed. The size is then pumped to one of the four 4300-gal. storage tanks, each supplying one of the paper machines. Flow to the steel rubber-lined tanks is regulated by DeZurik valves.

DeZurik valves on each of the tanks automatically cut in a water rinse for flushing the tanks when empty. Each tank is equipped with an 84-rpm Mixco agitator driven by a 3-hp motor. The tanks are connected to the paper machines by 1½-in. stainless steel lines. Size is pumped to the surface size presses by 100-gpm 1½-hp units. Float valves at the presses control flow depending on the level in the tubs.

Northeastern Lumbermen Urged to Market Chips

The normal waste by-product of a lumber mill can be turned into profit through the production of wood chips for pulp manufacture. This was the theme of the recent annual convention in Boston of the Northeastern Lumber Manufacturers Association.

Speakers at a discussion of better wood utilization urged the lumbermen to install debarking and chipping equipment. They were warned, however, that they must reach an agreement with the pulp industry as to the sizes, quality and species of chips required.

Joseph R. Wilner of Norway, Maine, chairman of the association's wood utilization committee, declared that, "Lumber manufacturers are building a brand new industry around an old one" by the utilization of "prime wood fiber"—material formerly rejected as waste. This fiber, he said, is readily accepted by pulp producers.

"The paper mills are the best friends we have," the speaker continued, "but we have to educate them to our point of view" in regard to the pricing of wood chips. Declaring that further research is needed to find other uses for prime wood fiber, Wilner urged producers to appropriate funds for studies of potential products and markets.

Gains Called Surprising

Dr. J. A. Hall, director of the U.S. Forest Products Laboratory in Madison, Wis., expressed astonishment at the gains made by northeastern producers in recent years in increasing their utilization of waste materials.

He warned that pulp mills would not buy chips on a "haphazard basis" but would insist on suitable volume and quality. Dr. Hall suggested that working committees of representatives from the lumber and pulp industries be formed to set standards for the size, quality and species. Prices paid by the pulp producers, he continued, would depend on the amount of yield and the equipment changes necessary to accommodate chips in the pulp mill.

In conclusion, the speaker advised the lumbermen to study the possibilities of converting sawdust into utility-grade pulps and to increase the production of particle board.

Coated Paper Course at Western Michigan

The special summer course, Principles and Practice of Coated Paper Manufacture, will be offered by the paper technology department of

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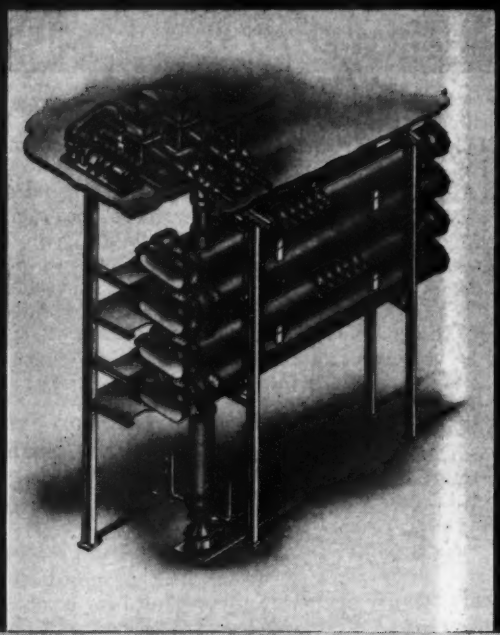
Continuous Digesters produce over 1 million tons of pulp every year

The success of the Chemi-Pulper®, the Continuous Digester built by the Pandia Division of The Black-Clawson Company, is reflected in these production figures.

Based on a 350 day operating year, Chemi-Pulpers in operation throughout the world are producing 1,204,000 tons of all kinds of pulp a year. Tonnage of Chemi-Pulpers now being built adds up to 263,200.



Approximately 86% of the operating and "in process of building" capacity is in the United States and Canada.

Get the full Chemi-Pulper story from Pandia—ask for latest Chemi-Pulper Bulletin No. PC-20.

	Present Production	Tonnage Now Being Built
Felt Pulps (Roofing and Flooring Grades)	420,000	17,500
Building Board Pulps	94,500	35,000
Straw Pulp		24,500
Bagasse Pulp	5,250	
Corrugating Board Pulps	519,750	105,000
Bleached Hardwood		
Neutral Sulphite Pulps	31,500	
High Yield Kraft & Special Pulps	63,000	46,200
Bleached Kraft Pulps	70,000	35,000
Totals	1,204,000	263,200

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Western Michigan University at Kalamazoo, Mich. Dates for the two sessions will be June 23 to July 13 and July 14 to August 3.

(By action of the Michigan legislature in its 1957 session, the official name of Western Michigan College was changed to Western Michigan University.)

The limit for each period is 20 students, and it was expected that registrations would be closed before the end of April.

The course is to be taught by the entire paper technology faculty: Dr. A. H. Nadelman, head of the department; Dr. R. A. Diehm; Miss Carola Trittin, and Raymond Janes.

Philip Morris to Acquire Milprint

In a major step toward packaging research and manufacturing integration, Philip Morris Inc. is planning to acquire Milprint Inc., one of the nation's leading flexible packaging producers. The boards of directors of the cigarette manufacturer and Milprint have approved the action, which is now subject to stockholder go-ahead.

Under the plan, Milprint will operate as a separate subsidiary with the present management and operating practices.

Milprint operates nine plants throughout the country. Its principal operation is in Milwaukee. Regional plants are located in Philadelphia, Christiana and Downingtown, Pa.; Los Angeles; San Francisco; Tuscon, Ariz., and DePere, Wis.

Construction Scheduled for Bowaters Carolina Mill

Construction of the new Bowaters Carolina Corp. sulfate pulp mill at Catawba, S. C., was set to begin in April.

The proposed 400-ton plant is scheduled for completion by the end of 1959 and will cost an estimated $38,000,000. The announcement was made by K. O. Elderkin, president of Bowaters Research & Development Inc.

Pulp Plant OK'd for Saskatchewan

Three southern California businessmen will undertake a wood pulp project northwest of Prince Albert, Sask., that is expected to cost between $40,000,000 and $54,000,000. Spokesman for the group is Ellis E. Patterson, former lieutenant governor of California.

Authorization for the extensive project was made by A. G. Kuziak, provincial minister of natural resources.

The mill, according to Patterson, will produce a daily minimum of 600 tons of newsprint and kraft pulp. Construction is scheduled to begin in the fall, with completion expected about two years later.

The Saskatchewan government has granted the newly organized firm an option on 12,000 sq. mi. of Crown-owned virgin timberlands. The contract is in perpetuity, subject to renewal every 25 years.

Continuous Digester Installed in Japan

The Japanese paper industry is installing its second continuous digester system of American design. The unit is designed for the production of high-yield kraft pulp suitable for linerboard.

The Pandia system was supplied by the Pandia Div. of Black-Clawson Co. at Hamilton, Ohio. The in-

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stallation is at Takasaki Paper Mfg. Co. in Nikko, Japan. (The first Pandia system in Japan is at Kanzaki Paper Mill Ltd. in Osaka.)

The Takasaki mill will utilize Japanese red pine, beech and birch. The system is designed to produce a daily 120 metric tons. It consists of a 15-in. screw feeder, a four-tube continuous digester with tubes 42 in. in diameter and a 28-in. discharger. It will be equipped for cooking liquor circulation in the impregnation stage.

$83 Million Needed for Non-Federal Fire Defense

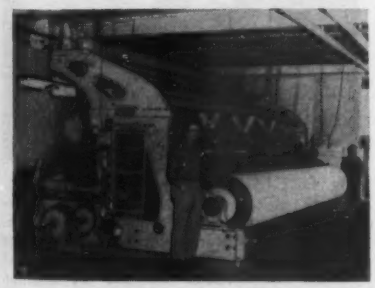
Some $83,000,000 is needed annually for forest fire protection on 432,000,000 acres of non-federal forest land, according to figures recently compiled by the various states and reported by the United States Forest Service. (Forty-four states and Hawaii participate in the state-federal cooperative forest fire protection program.)

This new cost figure compares to $48,000,000 estimated for the protection of 426,000,000 acres in 1950 and the $42,000,000 actually spent in 1956 to protect 387,00,000 acres of non-federal land.

The increased cost estimates were due primarily to the states setting higher goals for the protection of forest and watershed lands.

Also, many states have increased the pay scales for fire control personnel to bring those wages in line with prevailing rates. Others, confronted with a manpower shortage, plan to purchase additional mechanized equipment.

(Turn to page 148)



TWO NEW 256-in. looms are now in operation and a third under construction at the plant of Wisconsin Wire Works. Part of a large expansion program underway at the Appleton, Wis. plant, the looms are 20 to 25 per cent faster than most units of comparable size.

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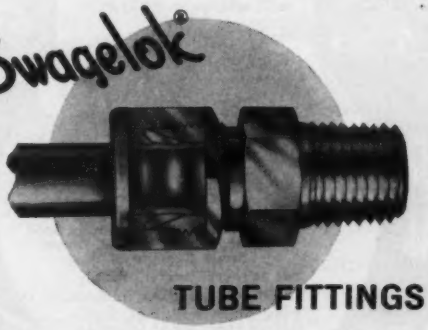

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Recent Expansions in the Industry

James Maclaren Co. Ltd.
of Buckingham, Que., will construct an $8,000,000 power plant that will generate an estimated 35,000 to 40,000 hp.

Lily-Tulip Cup Corp.
will manufacture molded pulp products (compartment plates, etc.) to complement its line of paper cups and containers. Old Town Pulp Products Inc.—a newly organized and wholly owned Lily-Tulip subsidiary—has acquired Old Town Co. at Old Town, Maine, an established manufacturer of smooth surface plates.

Johns-Manville Corp.
has reported that two new insulating board plants will soon join the J-M production line, almost doubling the firm's manufacturing capacity in wood fiber products. Located at North Bay, Ont., and at Klamath Falls, Ore., the units will augment present production at Jarratt, Va., and Natchez, Miss. Test production runs are now underway at the Ontario location, while production is scheduled for early 1958 at the Oregon plant.

Miami National Container Corp.,
a subsidiary of Owens-Illinois Glass Co., has opened southern Florida's largest corrugated box plant. Located in Hialeah, a suburb of Miami, the operation boasts a 78-in. corrugating machine, as well as slitters, slotters, die-cutting machines, printing presses, stitchers, folders and tapers. The new plant provides three times as much working area as was available at the firm's former location.

International Paper Co.'s
container division will construct a corrugated shipping container plant at Fond du Lac, Wis., it was announced recently by officials of the Greater Fond du Lac Development Corp.

Crown Zellerbach Corp.'s
San Leandro, Cal. converting division is to be consolidated with the new manufacturing and converting facilities at Antioch. The move of converting machinery and other equipment is expected to be complete about September 1 and is being undertaken for better operating efficiency.

Sealright-Oswego Falls Corp.
is the new name recently approved by stockholders for Oswego Falls Corp. of Fulton, N. Y.

Pacific Paper Products Inc.
is a newly organized firm that will build in Tacoma, Wash., a plant for the production of disposable paper products for use in hospitals, clinics and doctors' offices. Operation is expected about September 1.

Hammermill Paper Co.
of Erie, Pa., has postponed for one year plans to build a paper mill near Franklin, according to a recent announcement from the Pennsylvania State Health Department. The statement emphasized that Hammermill is not abandoning plans for the new mill.

St. Joe Paper Co.,
with headquarters at Jacksonville, Fla., will build near Albany, Ga., one of the nation's most modern sawmills. The firm has been operating the mill of Reynolds Bros. Lumber Co. since purchasing it some time ago. The Reynolds mill operation is to be discontinued on completion of the new $500,000 plant. (St. Joe operates a paper mill at Port St. Joe, Fla.)

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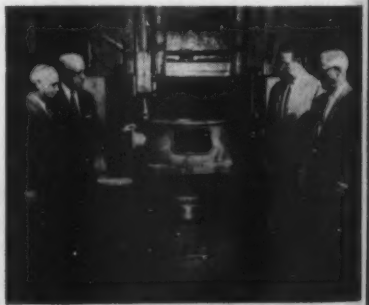

ON OCCASION of the firm's 75th anniversary, officials of Layne & Bowler Inc. inspect a giant milling machine at the Memphis plant. The world's largest developer of ground water and a major manufacturer of pumps was founded in 1882 by Mahlon Layne in the Dakota Territory, later expanding operations into Texas at the time of the Spindletop oil boom. Shown above are (l to r): A. O. Fabrin, vice president in charge of engineering; William H. Reeves, president; Frank T. Quinn, vice president in charge of manufacturing, and L. G. Ost, secretary-treasurer.

News of the Industry . . .

St. Regis Paper Co.'s toweling and printing paper mill at Carthage, N. Y., is to be put up for sale. The plant was recently closed because of "inability to operate economically". Resident Manager J. E. Kussman reported that an attempt will be made to sell the mill as a unit rather than piecemeal.

Allied News Briefs

Clinton Corn Processing Co. of Clinton,Iowa, observed its 50th anniversary April 22. Originally founded for the manufacture of glucose, Clinton Corn now produces no less than 40 products derived from corn, including many used for internal and surface sizing and paper coatings. According to H. A. Bendixen, vice president and general sales manager, the daily processing rate has increased from the original 3000 bushels of corn in 1907 to 65,000 bushels (or 38 carloads) in 1957.

The Tubular Products Div. of **Babcock & Wilcox Co.** has opened a district sales office in Atlanta to serve the states of Georgia, South Carolina, North Carolina, Alabama, Florida and the southwestern section of Tennessee.

Coming Events

Tappi

May 20-23—Eighth Coating Conference, Pfister Hotel, Milwaukee

May 20-21—Maine-New Hampshire Section, Somerset Hotel, Rockland, Maine

May 23—Delaware Valley Section, Engineers' Club, Philadelphia

May 24-25—Southeastern Section, General Oglethorpe Hotel, Savannah, Ga.

Superintendents Association

May 21-23—National Meeting, Congress Hotel, Chicago

June 6-8—Pacific Coast Division, Gearhart Hotel, Gearhart, Ore.

Other Meetings

May 20—Greater New York Safety Conference, Paper & Pulp Section, Hotel Sheraton, New York, N. Y.

May 21-22—National Paperboard Association (spring meeting), The Greenbrier, White Sulphur Springs, W. Va.

May 22-24—American Society for Quality Control (annual meeting), Masonic Temple, Detroit

May 22-24—American Institute of Chemists (annual meeting), Sheraton-Mayflower Hotel, Akron, Ohio

June 5-7—Canadian Pulp & Paper Association, Technical Section, Saranac Inn, Saranac Lake, N. Y.

Fisher Governor Co. of Marshalltown, Iowa, has appointed Power & Controls Inc. of Seattle as sales representative in the state of Washington.

Westinghouse Corp.'s Paper Mill Forum, a technical seminar for the paper industry's operating and management personnel, has started its tour of the nation's papermaking centers. Thirty locations in 24 states are to be visited. Object of the project is to bring before the industry the most recent thinking of Westinghouse development engineers on technical subjects relating to the manufacture of paper.

Roots-Connersville Div. of Dresser Industries Inc. has recently established a Boston district sales office at 945 Great Plain Ave. in Needham 92, Mass.

Link-Belt Co. will build in Indianapolis a $5,000,000 bearing plant to replace and increase by 50 per cent the capacity of the present Dodge operation. Full production is scheduled for 1959.

Miehle-Goss-Dexter Inc. has acquired E. P. Lawson Co. Inc. as a wholly owned subsidiary. Lawson is a manufacturer of paper cutting and bindery equipment.

Kelco Co. is building a $250,000 research laboratory in San Diego, Cal., to provide technical service in the solution of customers' product and processing problems.

DOUBLE DUTY

. . . through the use of *Kalamazoo* Glazed Tile Chests

This photo shows a section of a row of 15 glazed tile chests. Not only do they provide the cleanliness, free circulation and corrosive resistance of glazed tile but their walls furnish ample support for the mill floor. Note the pockets provided for the insertion of concrete floor beams.

Kalamazoo's steel reinforced concrete and glazed tile construction may economically solve your problems in the installation of chests and tanks in new and old mill buildings.

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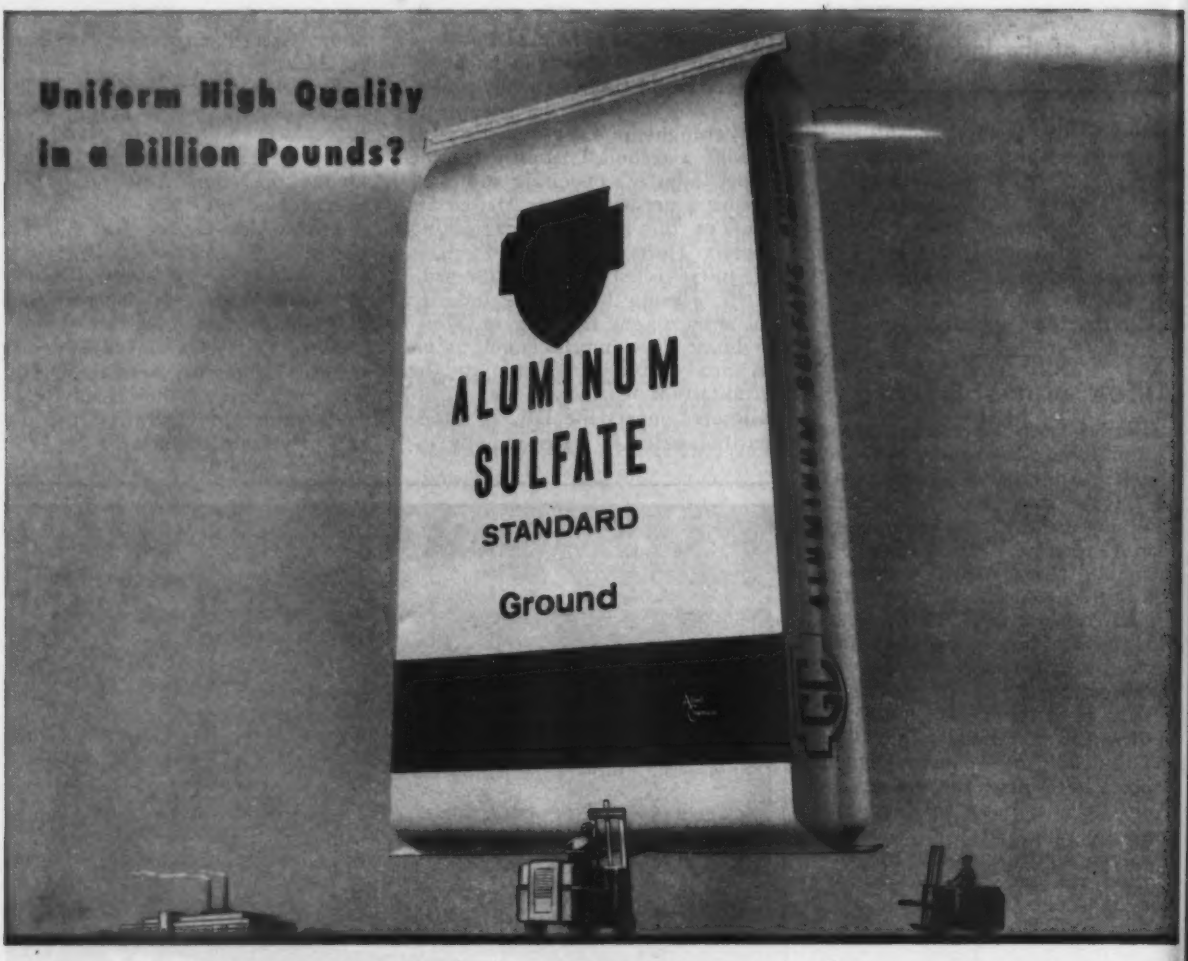

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NAMES in the NEWS

Adams Succeeds Ferguson as St. Regis President

William R. Adams has been elected president of St. Regis Paper Co. to succeed Roy K. Ferguson, who continues as board chairman and chief executive officer. Adams was formerly vice president in charge of manufacturing.

In a series of other top executive changes, Edward R. Gay, executive vice president, was named vice chairman of the board. Arch Carswell, vice president in charge of sales since 1953, becomes an executive vice president, as does Benton R. Cancell, president of Rhinelander (Wis.) Paper Co. (Rhinelander is a St. Regis subsidiary.)

Ferguson, who is completing his 40th year with St. Regis, has served as president since 1934. Adams, who joined the firm in 1937, has been vice president since 1949, in charge of all manufacturing since 1953 and a director since 1952.

W. R. Adams

W. W. Dipman

William W. Dipman has been named director of market research and development for Union Bag-Camp Paper Corp. He was formerly assistant to the vice president in charge of bag sales.

East Texas Promotions

East Texas Pulp & Paper Co. at Evadale, Texas, announces promotions in the Engineering, Maintenance and Technical divisions as follows:

John S. Hartman, plant engineer since June 1953, becomes chief engineer; Robert L. Paret, formerly master mechanic, plant engineer in charge of maintenance and service; James G. Lee, power department supervisor, mechanical maintenance supervisor; Harry H. Bonifay, assistant master mechanic, master mechanic, and William A. Moggio, chief chemist, has been assigned a special project in the development of the mill's effluent program.

J. C. Michaud

Robert Groner Jr.

Continental Can Elects Michaud Vice President

John C. Michaud has been elected vice president of Continental Can Co.'s newly formed Container Board & Kraft Paper Div.

Michaud was previously resident manager of the plant of Southern Advance Bag & Paper at Hodge, La. He will be in charge of Continental's Hopewell, Va. paperboard mill; Southern Paperboard Corp. at Port Wentworth, Ga. (60 per cent owned by Continental); Gair Woodlands Corp. (a wholly owned subsidiary), and the Hodge operation.

In another Continental Can appointment, Robert Groner Jr. was named general manager of the western district of the Fiber Drum & Corrugated Box Div. He was previously southeastern container district manager for Robert Gair Co. Inc. prior to the merger of Gair and Continental.

Mando Names Cook

The appointment of William B. Cook as supervisor of paper research at Minnesota & Ontario Paper Co.'s laboratory in International Falls, Minn., has been announced by Dr. J. O. Burton, Mando director of research.

At one time associated with Champion Paper & Fibre Co. at Pasadena, Texas, Cook was formerly coating superintendent at Mando's specialty paper mill.

And Harold E. Ramberg, formerly mill stores supervisor at Kenora, has been appointed purchasing agent for Ontario-Minnesota Pulp & Paper Co. Ltd., Canadian subsidiary of Minnesota & Ontario.

For the past two years Ramberg has been purchasing assistant assigned to H. A. Simons Ltd., a consulting engineering firm responsible for the installation of a high-speed Beloit Iron Works newsprint machine at Kenora.

Container Corp. Reports New General Managers

Headquarters of Container Corp. of America at Chicago has recently announced the following appointments:

William H. Richards as division general manager of paperboard mills at Los Angeles and Santa Clara, Cal., and at Tacoma, Wash.; Jack W. Williams as division general manager of folding carton plants at Los Angeles, Santa Clara and Seattle; Roger B. Kirkpatrick as general manager of the Philadelphia fiber and corrugated plant; Stanley L. Oberg as division general manag-

W. H. Richards

J. W. Williams

S. L. Oberg

G. R. Grant

er of plants in Texas, Oklahoma, Illinois and Iowa, and Gerald R. Grant as general manager of the Anderson, Ind. corrugated container plant.

It was also reported that Ralph E. Eckerstrom succeeds Herbert Bayer as director of Container Corp.'s department of design. He was previously art director and associate professor at the Unversity of Illinois. Bayer becomes chairman of the department.

Cox Retires at Oxford

Edward W. Cox, at 91 one of the country's oldest active paper company executives, has announced his retirement from the board of directors of Oxford Paper Co. at Rumford, Maine. Stockholders immediately named him an honorary director.

A 59-year veteran with the New England paper firm, Cox saw the Oxford organization grow from an undeveloped power site in the wilderness to its present multimillion dollar stature.

Cox is being succeeded by Chester G. Abbott, president of the First Portland (Maine) National Bank.

In another appointment, Gorham H. Scott, vice president and treasurer of Rumford Falls Power Co., was promoted to the position of assistant to the president of Oxford. (Rumford Falls Power is a subsidiary of Oxford.)

Two New Managers Appointed by Mosinee

C. M. Green has been promoted to the position of general manager of Mosinee Paper Mills Co. of Mosinee, Wis., where for the past 18 years he has been plant manager. At the same time, John A. McPherson, assistant plant manager since 1947, succeeds Green as plant manager.

Green, who became plant manager in 1939, is a chemical engineering graduate of the University of Michigan. He joined Mosinee in 1925 at the pulp mill. In 1948 he was named to the board of directors.

Swaim Elected by Alton

Marvin W. Swaim has been named president of Alton Box Board Co. to succeed F. Burch Ijams, who has been named chairman of the board.

Associated with the company since 1926, Swaim was first vice president and general manager prior to his recent appointment. A director and former president of the National

Names in the News . . .

Paperboard Association, he is also a director of the National Association of Manufacturers, the New Orleans & Great Northern Railroad and the First National Bank & Trust Co. of Alton, Ill.

MacMillan & Bloedel Personnel Changes

Several appointments and promotions have been reported by MacMillan & Bloedel Ltd. at Vancouver, B. C., following production start-up at the Alberni Pulp & Paper Div.

D. A. Brewster, formerly assistant to the general manager for pulp and paper, becomes assistant to the vice president for pulp and paper.

H. A. Kelley, machine room superintendent, becomes assistant manager at the Alberni division in charge of the groundwood mill, paper mill, finishing, warehousing and shipping. L. L. Karnath has been named paper mill superintendent; D. B. Loyd superintendent of technical services; S. W. Forstrom superintendent of power and engineering services, and A. S. Millar plant engineer.

Eastern Promotes Naugler

Allan J. Naugler has been promoted to the newly created post of assistant to the general superintendent of the Brewer, Maine paper mill of Eastern Corp.

A native of Brewer, Naugler joined Eastern in 1935 as a helper on the paper machines, became foreman in the finishing department and later was placed in charge of special projects in the department. Previous to his most recent appointment he headed the reorganization of the mill operating office, handling the installation of new methods for order processing.

A. J. Naugler

G. J. Pecaro

George J. Pecaro has been elected executive vice president of Flintkote Co. He was formerly general vice president and succeeds Perce C. Rowe, who was recently named president. Pecaro joined the company in 1939.

Thomas M. Barry has been named manager of the East Millinocket, Maine mill of Great Northern Paper Co. He was formerly manager of northern mills for Scott Paper Co.'s Hollingsworth & Whitney Div. Barry was at one time associated with Fraser Paper Co. Ltd.

John F. Campbell, formerly assistant plant superintendent, has been named acting plant superintendent at the new Sunbury, Pa. insulating board mill of the Barrett Div. of Allied Chemical & Dye Corp. He replaces William Herbert, recently transferred to the New York, N. Y. office as acting chief construction engineer.

S. W. Franklin, former general sales manager of the Cup & Container Div. of Hudson Pulp & Paper Corp., has been named vice president for marketing of Atlantic Gummed Paper Corp.

Charles R. Mulcahy has been named Division A manufacturing superintendent at Charmin Paper Products Co. in Green Bay, Wis. He was formerly technical assistant to the general manufacturing superintendent and prior to joining the Charmin staff in 1954 had been associated with Libby-Owens-Ford Glass Co.

Miss Elizabeth S. Gray, assistant secretary since 1938 and acting secretary since 1953, has been named secretary of Chesapeake Corp. of Virginia.

Otis D. Hallin, formerly vice president for timber of Crown Zellerbach Canada Ltd., has been appointed assistant vice president for timber of the parent Crown Zellerbach Corp.

Wentworth Brown, general manager of the Paper Div. of the Latin American Paper & Chemical Group, has been elected a vice president of W. R. Grace & Co.

Charles M. Carrier, vice president and manager of manufacture for Great Northern Paper Co., retired April 1 after more than 40 years with the firm. He had been in charge of all manufacturing since 1952. Carrier is being succeeded by

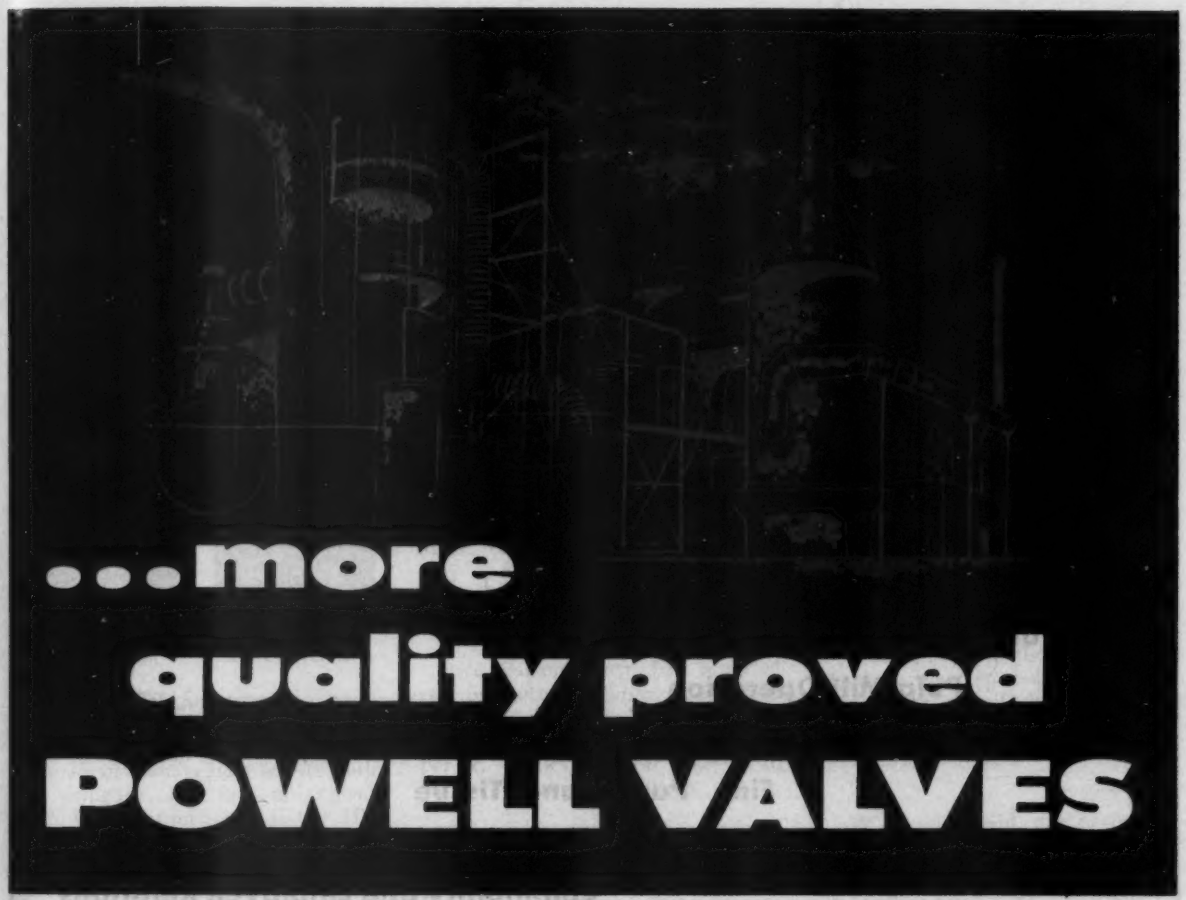

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FIG. 1314A—1500-Pound Integral Bonnet Stainless Steel "Y" Valve.

FIG. 2453SG—Stainless Steel O.S.&Y. Gate Valve for 150 Pounds W.P.

FIG. 2342—Stainless Steel Bolted Cap Swing Check Valve for 150 Pounds W.P.

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Names in the News . . .

J. H. Heuer, former assistant manager of manufacture.

Leo S. Burdon has retired as assistant vice president of Scott Paper Co. in Everett, Wash., after many years in the pulp and paper industry. He was vice president of Soundview Pulp Co. prior to its merger with Scott.

Leo. S. Burdon

L. W. Strattner

Lawrence W. Strattner, vice president of West Virginia Pulp & Paper Co., retired in March following 41 years of management service with the company. His first assignment with West Virginia was at the Mechanicville, N. Y. mill as assistant to the superintendent of the bleach and whiting plant. He was made vice president in 1947 with a function covering production, research and engineering.

Allied Personalities

Jost A. Braam has been named director of industrial relations for Lunkenheimer Co. He has been associated with the firm 48 years and was previously time study engineer.

Thage Dahlgren has resigned as manager of the Paper Div. of Pioneer Salt Co. and Pioneer Chemical Works Inc., with which he has been associated 11 years. Dahlgren has formed Dahlgren Chemical Co. of Conshohocken, Pa., which will serve the pulp and paper and allied industries with quality chemical products.

M. Nielsen, for the past two years executive vice president, has been named president of Babcock & Wilcox Co. to succeed **Alfred Iddles,** recently retired.

John C. Standish has been elected president of Albany Felt Co. to succeed the late Lewis R. Parker. Standish joined the firm in 1921 as assistant superintendent of the Albany plant. He was named executive vice president in 1954. Also announced were the promotions to vice president of **Everett C. Reed,** assistant vice president since 1954, and of **Z. J. Chagnon,** executive vice president of Albany Felt Co. of Canada Ltd.

The Paper Div. of National Starch Products Inc. has announced the following supervisory promotions in the paper technical group: **John Doherty** in converting; **Emil Mazzarella** in general application, and **Donald S. Greif** in coating. . . . It has also been announced by National Starch that **Paul H. McCormack** has been placed in charge of application engineering for the Structural Products Div.

Warren G. Hamblet, president of Hamblet Machine Co. in Lawrence, Mass., celebrated his 92nd birthday May 4. Still quite active in the affairs of the firm, he is at his office daily.

Rice Barton Corp. has reported two promotions: **Philip A. Peterson** as sales engineer in charge of northern New England, and **John C. Harper Jr.** as sales engineer assigned to the special projects division.

Edward P. Gillan recently retired as technical manager of the Corn Products Div. of Anheuser-Busch Inc. He is to become a technical consultant in the field of starches and starch derivatives.

Necrology . . .

Charles T. Dole

Charles T. Dole

Charles Thurston Dole, 89, retired president and director of Champion-International Co. at Lawrence, Mass., died March 27.

A Harvard graduate and widely known as the "dean of the quality coated paper industry", Dole started his career with C-I as sales manager in 1902. He later became a director and vice president and was elected to the presidency in 1932, a position he held until 1946. For three years he served as chairman of the executive committee until his retirement in 1949.

Shortly after the turn of the century Dole joined the staff of Champion Card & Paper Co. (a forerunner of Champion-International) and was closely associated with Charles Minot Gage in the development and introduction of two-side coated papers for the printing industry. (Gage originated and patented the Gage Coater, then in wide use in both the United States and Europe.)

F. A. Dieckbrader

Fred A. Dieckbrader, manager of pulp and paper fills for Hinde & Dauch Paper Co. of Canada Ltd., died suddenly March 31. He would have completed 25 years of service with the firm in November.

Born in Cincinnati in 1905, Dieckbrader had wide practical experience in paperboard manufacture. He entered the industry as a boy at the Cincinnati mills of Container Corp. of America. He was associated with various other firms in the field prior to joining the H&D staff in 1932 to organize and supervise the paper box division. At the time of his death he was responsible for all pulp and paper manufacturing facilities of the company.

W. E. Mansfield, one of International Paper Co.'s oldest employees in point of service, died March 24 in Atlanta. He was 89. Having joined International at the time of its formation in 1898, Mansfield was closely associated with newsprint sales throughout his career and opened the firm's first southern sales office in Atlanta in 1899. He retired from active service in 1940.

Carlton W. Crumb, director of technical data for Dorr-Oliver Inc. and a member of the D-O organization almost 30 years, died April 6 at Stamford, Conn. Early in his career he served as a sales development engineer and contributed to the development of the Oliver top-feed filter and the Oliver salt-type filter. Prior to becoming director of technical data, he was sales promotion manager.

Joseph W. Taggart, former vice president of Taggart Bros. Co. Inc. (now Taggart Paper Mills Inc.), died April 1. He was 94 and a member of one of the most prominent families in Watertown, N. Y.

J. Albert Thomas, vice president and general manager of Roberts Filter Mfg. Co. in Darby, Pa., died in April. He was 54. Thomas was also vice president of Roberts Filter Co. of Canada Ltd.

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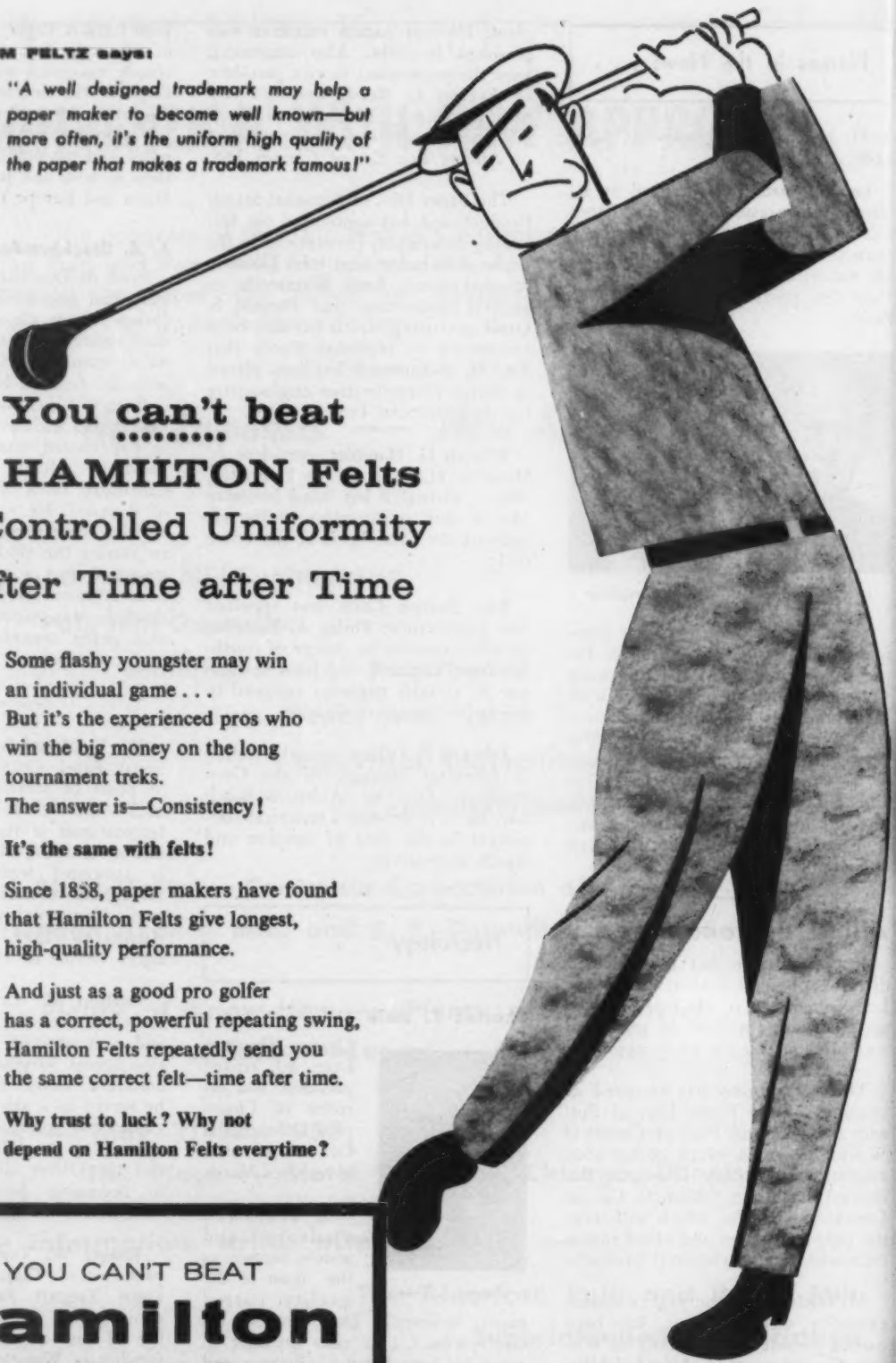

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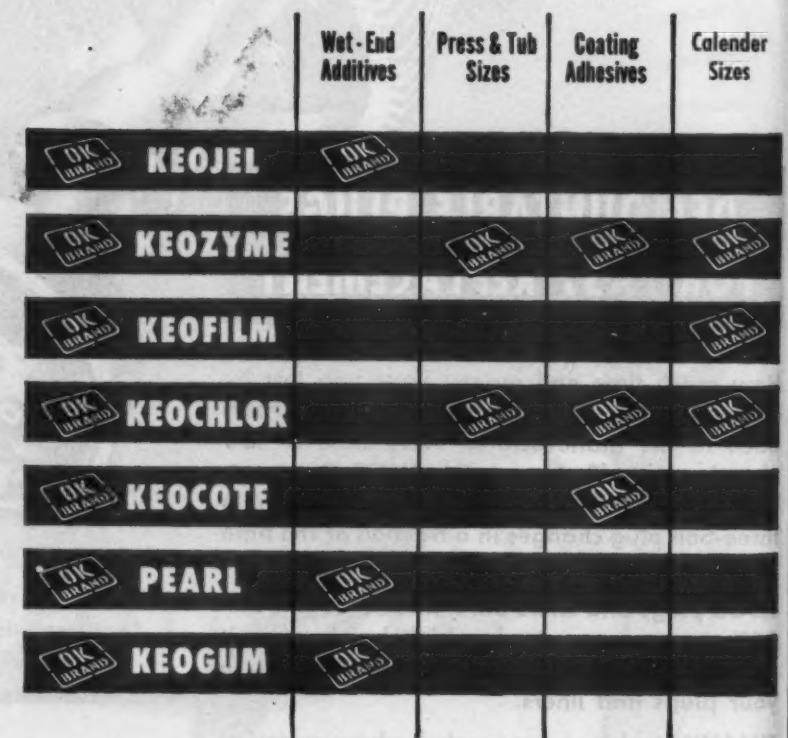

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FOREIGN ABSTRACTS

Semichemical pulps prepared by buffered liquors and with reducing chemicals

The authors prepared aspen pulps in an extensive series of cooks using varying amounts of sodium sulfite and sodium carbonate, impregnating for two hours and keeping the cook for two hours at a maximum temperature of 170°C. The total digestion required 7 hours, and the unbleached pulp yields ranged from 63 to 78 per cent, the Halse lignin from 9.5-19 per cent, and the brightness from 10-43 per cent.

For a specific sodium sulfite content, the highest yields, and the highest lignin and brightness were obtained at a pH of 6.5 to 6.7. Using a liquor containing 10 per cent sodium sulfite and 4-6 per cent sodium carbonate, and a maximum digestion temperature of 150°,C. the (unbleached) pulp brightness reached 59 per cent. With 14 per cent sodium sulfite and 2-3 per cent carbonate, the brightness was 63 per cent. When both high brightness and high pulp yields were sought, 150°C. could not be exceeded. The lower the maximum cooking temperature, the longer was the time of kollering required to disintegrate the pulp.

A cooking liquor with 10 per cent sodium sulfite and 4-6 per cent sodium carbonate gave pulps with the best strength properties, providing the maximum cooking temperature was kept at 140-160°C. With a cooking liquor containing 14 per cent sulfite and 2-3 per cent carbonate, the resultant pulps had strength properties that decreased steadily with decreases in the maximum temperature of digestion.

All the semichemical pulps prepared in this series, irrespective of the chemical concentration or the digestion temperatures, when subjected to sufficient beating could be converted into glassine stock.

In another series, pulping was carried out with sodium dithionite, using first microdigestions at 150°,C. and adding sodium hydroxide or sodium bicarbonate as buffers. Sodium carbonate buffer was used in all subsequent runs. In another series 100 gm. wood samples were digested at 150°C. (maximum) with 6-18 per cent sodium dithionite and 2-8 per cent sodium carbonate. The yields ranged from 76 to 85 per cent, the lignin from 11-14 per cent and the brightness from 49-62. At a constant dithionite concentration in the cooking liquors, the highest pulp yields were obtained with 6 per cent sodium carbonate; the highest brightness with 4 per cent carbonate. With increasing amounts of carbonate in the cooking liquors, the pulps (kollered to 50°C. S.R) showed decreasing strength properties. When the carbonate concentration was kept constant, pulp strength increased with increasing concentrations in dithionite. However this increase no longer was manifest when the dithionite concentrations reached 18 per cent. Evidently such high concentrations of this delignifying agent caused pulp degradation.

Comparative pulping studies were also made with cooking liquors containing 10 per cent sodium sulfite alone, with those containing 10 per cent of mixture of the sulfite and dithionite, and with 10 per cent of the dithionite alone. When hydrated 30 min., all these plups showed very similar strength properties, percentages of lignin, and the yields were also very similar. The dithionite produced pulps of greater brightness than did the sulfite, but the dithionite pulps proved more difficult to bleach further by the usual three-stage bleaching process. The best bleaching for *all* pulps involved a second stage in which only 0.1 per cent caustic soda was used, inasmuch as the yields were higher. Under these conditions, the bleached dithionite pulp was stronger than was the sulfite pulp. In all instances, folding endurance rose markedly after bleaching; especially with the dithionite pulps.

G. Jayme and R. Nischk *Wochbl. Papierfabr.* 85,7-9 (1957) (in german).

Research and operational progress in pulping

The author outlines, with adequate literature references, recent developments in North America, and places special emphasis on high yield and semichemical pulping, and on investigations carried out at the Pulp and Paper Research Institute of Canada. The subjects treated include: chip impregnation and air removal; developments in sulfite pulping; neutral sulfite semichemical pulping; the kraft process; cold soda digestion; and chemigroundwood.

Shorter pulping operations are essential both for higher yields and in the development of continuous cooking operations. The influence of cooking liquor composition on the yields of sodium sulfite pulps within a medium pH range is discussed. The value of the "Ross diagram" in using analytical data and in the determination of the defibration index are also stressed. One hundred and forty four references are included.

Theodor N. Kleinert. *Das Papier* 11,14-21 (1957 (in German).

Paper and writing materials in moist tropical regions

The author spent several years in French Guiana and in the upper Amazon, and made a number of tests and observations on the effects of the climatic conditions on the permanence of writing paper, books, blue print paper, carbon paper, films, etc.

In general, writing papers well-packaged in polyethylene or aluminum foil could be stored without deterioration in rain-forest regions. Other types of paper, especially carbon paper, could only be used to a limited extent, and only the best quality gave satisfaction and had to be protected against excessive moisture, which evidently was more harmful than was the heat.

Books kept in libraries in the tropics nearly all showed the effects of mildew and many of them suffered from insect attack. Special book-bindings are recommended; these include "Librafol" and "Wolfin".

In moist tropical climates, paper photographs are difficult to keep intact, and mucilage usually used in mounting them was found unsatisfactory. Microfilms, which are often so essential in keeping records, were best kept in parchment paper pockets, which were then placed in suitable light metal containers. It was essential never to press such films closely together, and the relative humidity within the container was best kept at 40-60 per cent. Films should not be rolled and then placed in cans; such treatment leads to their rapid disintegration. The use of fountain pens in moist tropical regions was found to be problematical.

Manfred Rauschert. *Allgem. Papier-Rundschau* 1957, 48-50. (in German).

Properties of tension wood in hardwoods

The formation of tension wood and its physiology, are discussed from the standpoint of macro-, micro- and submicroscopic characteristics, its chemical and physical properties, and their significance in the utilization of the wood. Special reference is made to birchwood. Regions of the tree containing tension wood, in cross section, are characterized by a silky sheen. In longitudinal section, the tension wood areas manifest a certain coarse wooliness or fluffiness. Generally the fibers of the tension wood are longer and thinner than those of normal wood, but their walls are actually thicker. The number of pores in tension wood is lower than in the case of normal wood. As a whole, tension wood gives the superficial impression of a gelatinous or horny material. The inner-most layer of the tension wood fibers (the "tertiary" layer) seems to occupy a large part of the wall and sometimes to fill up the cell lumen. The medullary ray portion of the wood in birch is somewhat smaller than is that of normal wood.

The high cellulose content of tension wood (and in most cases, the lower lignin

Foreign Abstracts . . .

content) is probably due to the tertiary layer of the fibers. The ratio of crystalline to amorphous cellulose also appears to be higher in tension than in normal wood. The volume weight of tension wood is usually greater than that of the normal wood. The former also shows a higher longitudinal shrinkage and swelling than does normal wood. The tangential and (in some cases) the radial shrinkage of tension wood is also higher than those of normal wood. As the percentage of tension wood increases, the time and the moisture content required for completely submerging the wood in water goes down. The wood substance of tension wood is slightly higher in specific gravity than is that of normal wood of the same species.

It is doubtful whether there are many hardwoods which at some time during their growth have not formed a certain amount of tension wood. The most annoying properties of tension wood in any mechanical woodworking operation are its high longitudinal shrinkage, its warping, twisting and even checking. The "wooliness" also presents a problem.

From a certain point of view, tension wood may be considered a better raw material for the paper pulp industry than is normal wood. However the high cellulose content, and the lower-than-normal hemicellulose content of the pulps made from tension wood have an unfavorable influence on the strength properties of the sheet.

Six figures and 51 references are given. Paavo J. Ollinmaa. *Paper and Timber* (*Finland*) 38, 603-611 (1956) (in Finnish with English summary).

The distribution of fillers in the various layers of the sheet

Two different paper sheets, one having an ash content of 10 per cent and the other of 20 per cent, were separated (in either case) into layers running parallel to the paper surface. The microtome used is shown in Fig. 1. The ash content of each layer was then determined.

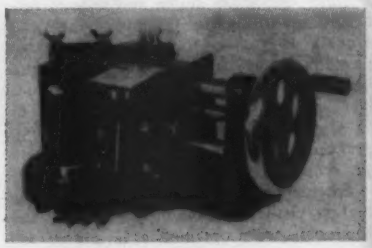

Fig. 1

Techniques are described in some detail, and the results which are shown graphically, confirm those of previous investigators, and bring out the differences in filler retention by the upper side and the wire side of the sheet.

Six references and three figures. Heinz Mack and Bernd Kleu. *Das Papier* 10, 564-6 (1956) (in German).

The dry content and the initial wet strength as determined in the laboratory

An unbleached sulfite pulp was beaten to different degrees (Schopper Riegler) and then drained on a Rapid-Kothen standard sheet machine.

Drainage was also studied with the dynamic suction box developed by Nordman (*Tappi* 37,553 (1954)). The two results gave diagrammatically opposite data with regard to the dry-content of the drained pulps. These differences are indicated in Figure 2 ("Trockengehalt" = percentage over-dry weight of pulp), in which the percentage dry weight is plotted against the degree, °S-R, of beating.

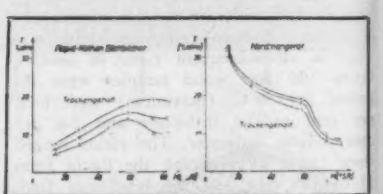

Fig. 2

The results were compared with the drainage of this stock on a papermachine. It was evident that the Nordman technique gave results that represented papermachine operation and resulting drainage more nearly than did the Rapid-Kothen. For this reason, the Nordman apparatus

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was used in determining the initial wet strength of paper sheets, in preference to the Rapid-Kothen.

The study was also extended to other pulps, including two other sulfite pulps and a partially bleached kraft pulp. The latter was more readily dewatered (at a specific freeness) than were the sulfite pulps. The relationship between initial wet strength, the "structural initial wet strength", and the dewatering processes is discussed.

Four graphs, one diagram, and six references are given. Walter Brecht and Adolf Gerspach. *Das Papier* 10, 535-9 (1956) (in German).

Effect of fillers on paper strength

The effects of China clay, calcium carbonate, barium sulfate, and two types of titanium oxide on paper strength were studied. Although the loading materials differed in their effects, especially on tensile strength and on folding endurance, but on the whole they tend to weaken the paper. Tearing strength however, remained almost unaffected by the fillers. The effect of beating a paper furnish containing China clay was also noted. The tensile strength of a sheet made from this *unbeaten* stock was more influenced by the filler than was that of the beaten stock.

The usual methods for determining the strength properties of paper are criticized. An attempt is made to give a theoretical explanation of the effects of the physical properties of the fillers and of the fibers, on paper strength.

Sixteen references and 19 illustrations are included. Juhani Aaltio. *Paper and Timber* (*Finland*) 38, 589-602 (1956) (in Finnish with brief English summary).

Improving lignin determinations on sulfite pulps

The Norwegian Pulp and Paper Research Institute carried out a critical study on the lignin determination, especially with regard to lignin losses (in the acid medium) due to the solubility of lignosulfonic acid.

Two gravimetric and 2 absorptiometric methods were studied: (a) a modified Halse method (slightly changed by the present authors; (b) the so-called CCA method using 72 per cent sulfuric acid; (c) an absorptiometric method using phosphoric acid [developed by Bethge, Gran and Ohlsson, *Svensk Papperstidn 55*, 44 (1952)] and (d) an absorptiometric method developed by the authors.

Most of the studies were made with a series of spruce sulfite pulps, but the gravimetric techniques were also applied to sprucewood and a few Kraft pulps. In the case of sulfite pulps, the gravimetric results obtained with (a) differed greatly from those obtained with (b)—the (a) values were much lower. Neither with (a) nor (b) was the relationship between the percentage lignin and the Sieber chlorine number, a linear one. Both with (a) and (b) appreciable amounts of lignosulfonic acid was lost in the filtrates; this was established by measuring the ultraviolet absorbance of these filtrates *after* carbohydrates and their degradation products had been removed by *dialysis*.

The sum of the gravimetrically determined lignin, and lignin determined in the dialyzed filtrates was the same irrespective of whether (a) or (b) had been used. This sum is termed "total lignin," and shows a linear relationship when plotted against the chlorine number of the pulps studied. Thus "total lignin" appears to be a genuine approximation of the true lignin content of a sulfite pulp. (A factor was used in converting absorbance to lignin values, based on determinations of the absorptivity of a lignosulfonic acid prepared by the authors).

Possible sources of error in the absorptiometric determinations (c) and (d) are discussed as well as limitations of the improved methods for routine control purposes. Before any method can be adopted generally, sulfite pulps prepared from other wood species must be studied. With sprucewood, or Kraft pulps, methods (a) or (b) appear satisfactory, and show insignificant lignin losses in the filtrates; hence the usual gravimetric procedures require no modification in such cases. Absorptiometric methods (without gravimetric techniques) are not applicable to

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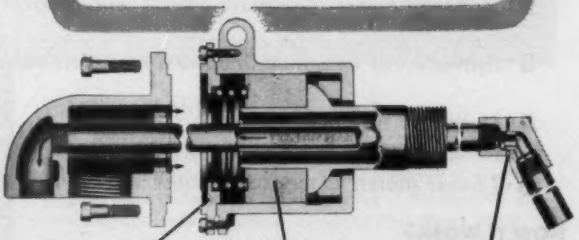

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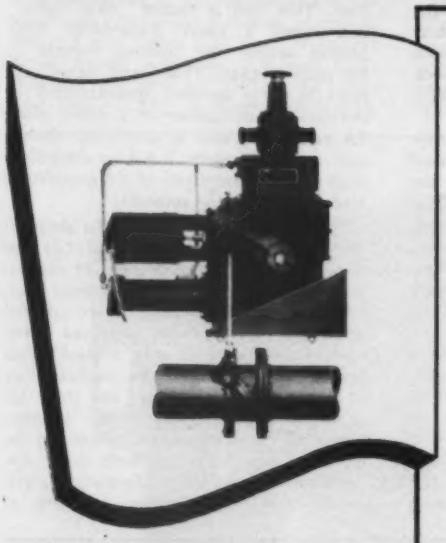
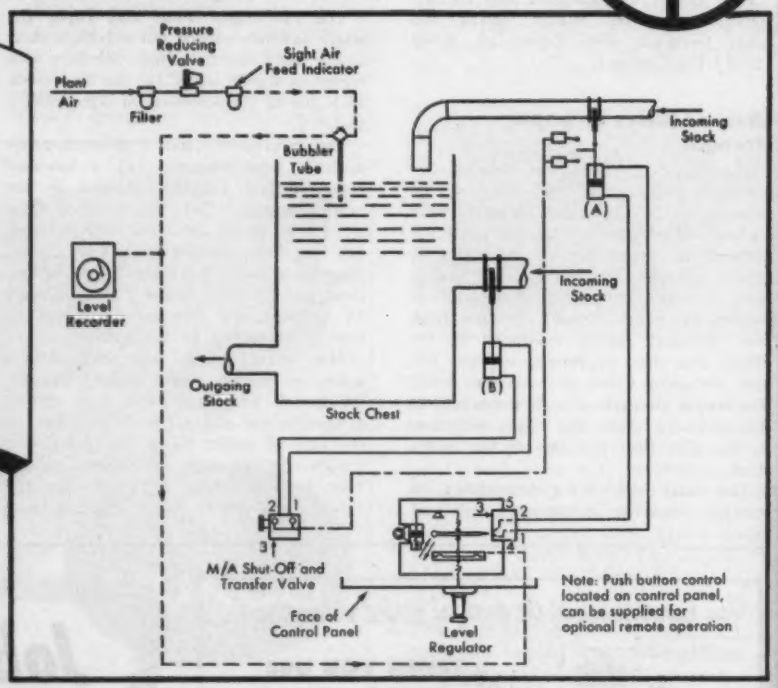
Askania Regulator Company NEWS

Controls for: Thin Stock Consistency, Stock Level, Flow, Pressure, Edge Position of Screens and Felts





CHECK THESE ASKANIA STOCK LEVEL CONTROL FEATURES:

1 · *Instant response to either small or sudden large changes in stock level*

2 · *Sufficient power to actuate largest and heaviest valves*

3 · *Operation of minimum and maximum flow valves in sequence*

4 · *Unlimited turndown*

5 · *Lowest maintenance cost for any stock level control element*

HOW IT WORKS

When the stock level deviates from the desired level, static pressure registered in the bubbler tube changes, and a signal is sent to the Jet Pipe Regulator which actuates the Hydraulic Cylinder "A" connected to the gate valve in the upper incoming line. Deviations of moderate magnitude are thereby corrected. However, when a major deviation from the desired level occurs, the piston is displaced to either end of cylinder "A" and thereby closes a limit switch, causing one solenoid of the Askania-Automatic Sequence Valve to be energized. The large piston "B" will then be displaced and thereby open or close the larger gate valve for corrective action until the level regulator causes the small piston to move from the list switch back into mid-range control.

ASKANIA POWERPACK

The Askania Powerpack Regulator is an example of a rugged and self-contained controller ideally suited for this application. Control relay, pump, and hydraulic cylinder are combined into one compact dependable unit. Liquid level, flow rate, pressure, etc. are readily controlled with this unit. By utilizing the knee action inherent in all Askania crank connections, the Powerpack cylinder provides maximum torque and slowest speed for small adjustments when valve is near its closed position.

Send today for bulletin 165 describing the POWERPACK and bulletin 26.3 describing ASKANIA Stock Level Controls. Write Askania Regulator Company ...294 E. Ontario St., Chicago 11, Ill.

ASKANIA REGULATOR COMPANY
"CONTROLS FOR INDUSTRY"
HYDRAULIC, ELECTRONIC CONTROLS & SERVOS, GENERAL SYSTEMS, ENGINEERING & COMPUTER SERVICE, VALVE ACTUATORS & CYLINDERS
A SUBSIDIARY OF GENERAL PRECISION EQUIPMENT CORPORATION

kraft pulps, but they give reasonably satisfactory results in the case of sulfite pulps (especially when lignin conversion factors are properly adjusted).

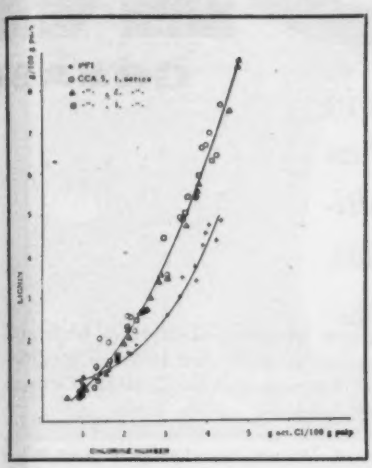


Fig. 3

Fig. 3 shows that gravimetrically determined lignin (when no correction is made for soluble lignin) does *not* show a rectilinear relationship to the chlorine number [+ signs refer to method (a); circles, triangles, and rectangles to method (b)].

Twelve figures and 29 references are given. V. Loras and F. Loeschbrandt. *Norsk Skogind. 10,* 402-13 (1956) (In English).

Proof printing in estimating paper printability

This estimate was formed as a result of proof printing in a Vandercook No. 4 proof press, at controlled printing speeds and pressures. The amount of ink transferred from the plate to paper is measured by weighing the plate before and after printing. The ink requirement of the paper (which is the amount of ink required to give a definite contrast) as well as the show-through at this ink density are measured optically.

In order to study the ink transfer, a wide variety of materials with varying surface properties were printed upon. Evidently at the moment of printing, the paper absorbs a certain amount of ink from the plate, and the remaining ink film is "symmetrically" partitioned between the plate and the paper. An increase in printing speed, a decrease in printing pressure, or an increase in the viscosity of the ink, all serve to reduce the transfer of the ink.

A plate was constructed which measures the printing pressure by piezoelectric means. For newsprint, the degree of correlation between some paper properties and printing data was investigated by the calculation of correlation coefficients. Good correlation was observed between ink requirement and show-through; between contrast ratio and show-through at low ink density, and between oil absorbency and ink absorbency. A somewhat lower degree of correlation was established between brightness and ink requirement, and between smoothness and ink transfer at low ink density. Sixteen illustrations and 10 references. Rolf Ginman, Anders Svedlin, and Lars Nordman. *Norsk Skogindustri 11,* No. 1, 14-21 (1957) (in Swedish, with English summary).

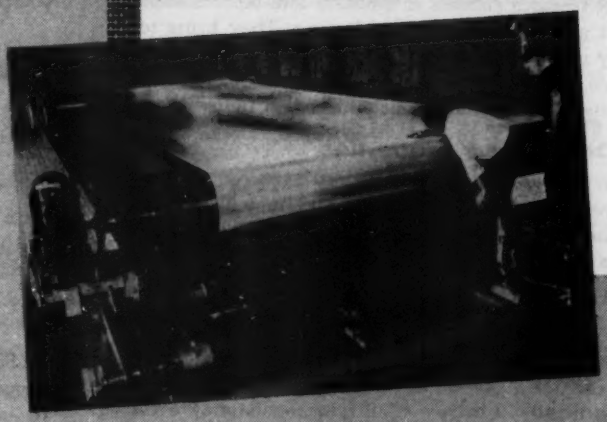
Prevention of pulpwood decay

The authors point out the seriousness of rot in stored pulpwood and call attention to some of the micro-organisms causing decay.

In combatting rot, the wood should either be dried rapidly after cutting to less than 25 per cent moisture, under which conditions fungal attack is less serious, or the billets should be kept thoroughly wet. Artificial drying processes proved too costly. Pulpwood may be kept in storage in suitable log ponds, the installation of which is rather expensive, but whose operation is relatively cheap. As an alternative, the logs may be kept sprayed and kept wet, in which case the installation is less expensive, but the operation demands an ample water supply and suitable canalization. Whether the latter process always furnishes ample protection against decay is still a question. If it is possible to dry the wood (before spring after felling), no further precautions need be taken.

Five graphs, 2 tables and 32 references are included. Franz Kollmann and Peter Lampson, *Holz, Roh-und Werkstoff 15,* 86-91 (1957) (in Germany, with brief English summary).

Two of the Men Behind Eastwood Wires



FINAL EXAM

Here James Baney and Clarence Reed are making a final, inch-by-inch examination of a large fourdrinier wire. Though this is a final check, it is only one of many given it at every stage of its manufacture, from the casting of the alloys in our own foundry to the stretching table inspection shown above.

Because the Eastwood-Nealley plant is a *completely integrated* operation, every wire we ship has undergone thorough and continual analysis, control and testing from the raw metals to your finished fourdrinier wire ready for quality paper production.

We are proud to say they are *truly ours* — "from ingots to fourdrinier wire".

EASTWOOD-NEALLEY CORPORATION
Belleville, N. J.

A new line of Standard Oil greases

RYKON

GREAS

Major breakthrough in grease technology results in development of new thickening agent. New grease has greater high temperature stability, superior multi-purpose qualities, improved lubricating properties.

Standard Oil instituted a grease research and development project several years ago. The result of this work is the line of RYKON Greases, which contain a unique new non-soap, organic thickening agent.

RYKON Greases surpass in stability and performance the best greases made up to this time. They bring to industry new opportunities for improved machine performance. They greatly reduce the maintenance and grease handling problems encountered in industry.

RYKON Grease properties

RYKON Greases are smooth, buttery-textured greases, made from the finest quality, solvent-extracted oil. Their thickening agent is a Standard Oil exclusive. RYKON Greases have these high-quality characteristics:

High temperature stability—Better heat stability than any other petroleum oil grease. ASTM dropping point of 480°F. Maintain consistency in service at high temperatures.

Mechanically stable—Maintain consistency even under severe mechanical working in service.

Chemically stable—Inhibit oxidation. Oil and thickening agent in combination possess extremely good chemical stability.

Wide temperature range—Lubricate at high and low temperatures. Extended range of application thus obtained makes RYKON Greases truly multi-purpose.

Water resistance—Do not lose consistency in presence of water. Highly resistant to water washout.

Oil separation—Minimum bleeding of oil in service and storage.

Anti-rusting—Exceptional natural rust preventive characteristics.

With RYKON Greases, lubrication can become simple, foolproof and less expensive—much less expensive, perhaps, than a single shut down caused by equipment failure due to the use of the wrong type of grease or the use of an "economy" grease lubricant.

RYKON Greases come in four Regular and three Heavy-Duty grades. Thus there is a RYKON Grease to take care of every grease lubrication job. Using RYKON Greases plant-wide can reduce your grease storage requirements, simplify lubrication maintenance training, cut down record keeping, save on dispensing equipment and reduce investment in grease inventories.

Get more facts about RYKON Greases. Call your nearby Standard Oil industrial lubrication specialist in any of the 15 Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Check Chart Of RYKON Greases

Regular Line	Grade Consistency
RYKON Grease No. 0	0
RYKON Grease No. 1	1
RYKON Grease No. 2	2
RYKON Grease No. 3	3
Heavy Duty Line	
RYKON Grease No. 0 E. P.	0
RYKON Grease No. 1 E. P.	1
RYKON Grease No. 2 E. P.	2

STANDARD

STANDARD OIL COMPANY (Indiana)

MR. ALEX PANCRAZI (left), Pisa Univ. (Italy) graduate, Chief Chemist, Eastern Wine Corp., Bronx, N.Y. (Right), Michael De Piano, N.Y. representative, Cooper Alloy Corp.

PANCRAZI OF CHATEAU MARTIN (Eastern Wine Corp.) tells why he specifies "Cooper Alloy Only" on stainless steel valves and fittings

Q. Mr. Pancrazi, why have you changed to stainless steel valves and fittings at Chateau Martin?

A. To assure product purity. Other metals can cause minute contamination reducing clarity and brightness; stainless steel does not.

Q. What valve model do you find most suitable?

A. After extensive testing, we picked a renewable-disc inside-screw globe valve—Cooper Alloy only.

Q. Why "Cooper Alloy only"?

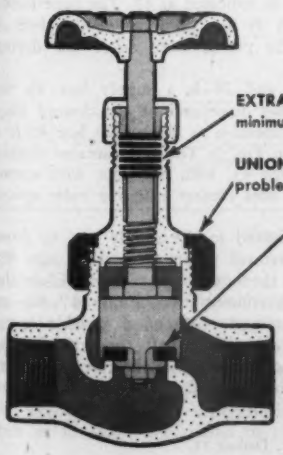
A. Because of three features I find combined nowhere else: renewable retained disc; union-bonnet construction; and extra-deep square-compression stuffing box.

Q. Why is each of these features important?

A. Soft disc gives better seal; retention in metal jacket prolongs its life. When disc replacement is needed, union-type bonnet eliminates difficulties normally found in screwed-in bonnets, removes another threaded joint from product contact. Extra-deep stuffing box with unique square compression reduces maintenance, gives tighter seal at stem.

Q. Don't any competitive valves possess these features?

A. Not one has them all. That's why, to maintain our product contamination-free and to reduce maintenance costs, we insist on "Cooper Alloy only."


EXTRA-DEEP STUFFING BOX holds minimum 6 turns Blue African asbestos
UNION BONNET JOINT eliminates problems found in screwed-in bonnets
RETAINED RENEWABLE DISC for tight seal and long life

COOPER ALLOY Figure 15RD Globe Valve, inside screw rising stem, 200-lb. service, screwed ends, renewable retained disc of composition you specify.

YEARS AHEAD IN DESIGN SUPERIORITY! No matter what your valve type—globes, gates, angles, checks, or Y's—the Cooper Alloy model's outstanding design features will be important to you. Cooper Alloy, with 35 years of pioneering experience in stainless steel, does not merely adapt existing brass and iron valve patterns; it creates valves *designed to be cast in stainless!* **Check the special design features of valve shown at left.**

As the little CA man below is saying: *"You Can Tell A Cooper Alloy Valve As Far As You Can See It!"* Write today for *your* copy of our folder "Design Factors In Stainless Steel Valves." The Cooper Alloy distributor near you will be glad to show you the complete line of Cooper Alloy valves *and fittings*, and their advantages. He can serve you promptly from local stocks.

COOPER ALLOY

Corporation • Hillside, New Jersey

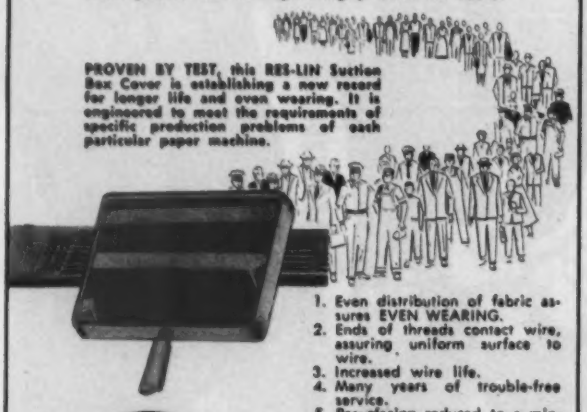
VALVE & FITTING DIVISION

THIRTY-FIVE YEARS OF STAINLESS STEEL PIONEERING

RESLIN *wire saver*

Suction Box Covers now lead

No other Suction Box Cover offers you so many advantages . . . that's why Mill after Mill have joined the fast growing parade of users.



PROVEN BY TEST, this RES-LIN Suction Box Cover is establishing a new record for longer life and even wearing. It is engineered to meet the requirements of specific production problems of each particular paper machine.

1. Even distribution of fabric assures EVEN WEARING.
2. Ends of threads contact wire, assuring uniform surface to wire.
3. Increased wire life.
4. Many years of trouble-free service.
5. Resurfacing reduced to a minimum.
6. Expansion and contraction is reduced to a minimum.
7. Reslin can supply a greater open area without sacrificing strength.
8. Requires no wet storage or care when machine is down.
9. Easily installed.
10. No other can offer as even-wearing and wax-like surface as Reslin.

WIRE RES-LIN SAVER

Write for Further Information and Sample of Material

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JOSEPH ROBB & CO. LTD.
MONTREAL 20, QUEBEC
LICENSED MANUFACTURER IN CANADA

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EQUIPMENT GROUTS

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gives *lasting* results on every equipment grouting job. Add only water to Embeco Pre-Mixed Grout, mix and place. Obtain a *flowable, non-shrink* grout that insures full bedplate contact, maintains alignment, has high impact resistance.

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the MASTER BUILDERS co.

CLEVELAND 3, OHIO TORONTO 9, ONTARIO

PATENT REVIEWS

MELVIN NORD*

Apparatus for applying aqueous dispersions in the manufacture of paperboard

U.S. 2,778,284, issued Jan. 22, 1957 to Chester R. MacDonald and assigned to Patent & Licensing Corp., relates to the production of multi-cylinder board in which a film of asphalt in the form of an aqueous dispersion is interposed between certain plies of the board during the course of its manufacture.

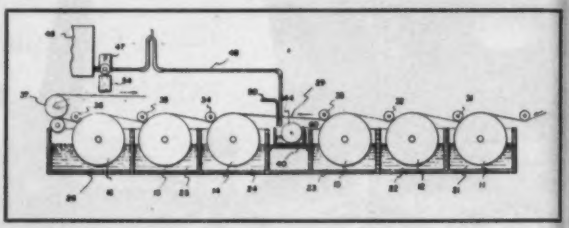


Fig. 1

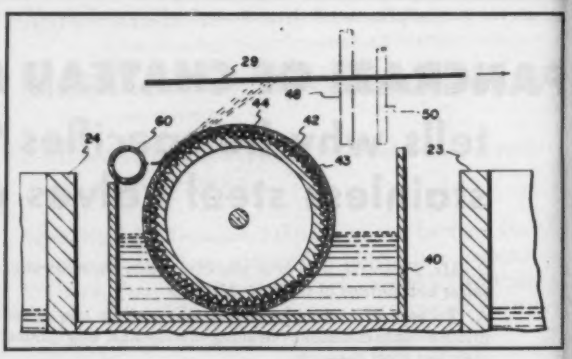


Fig. 2

The apparatus is shown in Figs. 1 and 2. Fig. 1 shows the wet end of a multi-cylinder machine for making six-ply paper board. The cylinders, one for each ply, are indicated at 11-16, and rotate in vats 21-26, so as to form plies of desired thickness from the aqueous suspensions of fibrous stock maintained in the vats. An endless felt 29 is mounted over the cylinders to receive the plies formed on the cylinders. Couch rolls are indicated at 31-36, and a reversing roll for the felt 29 is indicated at 37. The superposed wet plies are carried by the felt 29 to a point where the sheet is sufficiently self-sustaining to be passed over driers for drying and calendering the board.

Positioned between vats 23 and 24 is a supply box 40 for maintaining a supply of aqueous dispersion of the desired film-forming material. Mounted for rotation in the supply box 40 is a roll 42, constructed as shown in Fig. 2. The roll contains closely spaced longitudinal flutes or ribs 43, with a copper wire screen 44 secured around the roll, in firm contact with the outer apices of the flutes.

The asphalt emulsion is delivered to the supply box 40 from a tank 46 by a positive displacement pump 47 through pipe 48. A pipe 50 also feeds water to the box 40 in order to dilute the emulsion to the desired solids concentration. Pump 47 has its drive shaft connected to the output shaft of a variable speed transmission device which has its drive shaft connected to the shaft of roll 37, thus permitting regulation of the rate of supplying emulsion in accordance with the speed of the felt 29.

*Patent attorney, 17600 Pinehurst, Detroit 21.

Positioned at one side of the roll 42 is a pipe 60 running parallel to the axis of the roll. The pipe 60 is provided with a number of horizontal perforations through which compressed air flows, striking the roll 42 as shown in Fig. 2. Thus, emulsion carried up from the box 40 by the fluted, screen-covered roll 42 is blown from the screen up toward the felt and is deposited on the lower side of the wet, freshly formed ply of paper being carried by the felt 29.

When no interposed film is to be applied, the air jets are simply turned off, without any need for lowering or dismantling the supply box 40. Furthermore, the air improves the "lay-down" of the fibers in the freshly-formed plies, and eliminates bubbles which might otherwise be present on the surface of the paper at this stage.

Process for coating paper

U.S. 2,776,911 and 2,776,912, issued Jan. 8, 1957 to George P. Gregory and assigned to Hercules Powder Co., describes a process for coating paper with a new adhesive as a binder for the coating color, the binder being a gellable water-soluble salt of cellulose sulfate.

There results a coated paper having a base of cellulosic fibers and a printing surface consisting essentially of a film of contiguous pigment particles interspersed in a binder by means of which the pigment is maintained on the base.

Non-water repellent high-slip paper

U.S. 2,776,913, issued Jan. 8, 1957 to William E. Anderson and assigned to Riegel Paper Corp., relates to the production of sized glassine paper having a high degree of slip but which is easily wet with water adhesives and at the same time has low water absorbency.

The sized glassine paper is coated with a thin coating of Carbowax, which has the desired effect.

Treatment of waste sulfite liquor

U.S. 2,778,714, issued Jan. 22, 1957 to Andrew A. Kasper and William E. Katz, assigned to Ionics Inc., describes a method for recovering base ions from waste sulfite liquor and producing fresh sulfite cooking liquor.

The fresh sulfite cooking liquor is formed, at least in part, by recovering sodium or potassium, together with the desired acid or active component from a prior cooking liquor by a suitable ion exchange process.

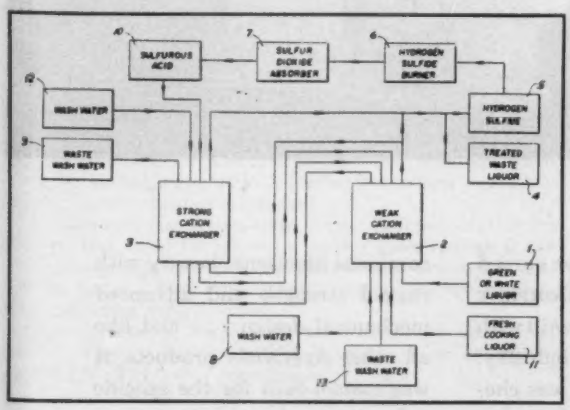
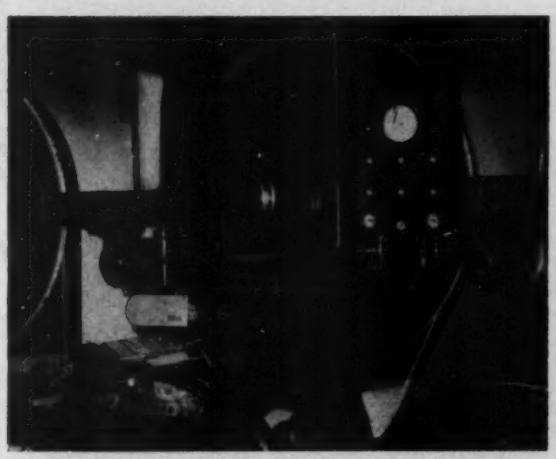


Fig. 3

As shown in Fig. 3, a tank 1 is provided for the storage of green or white liquor derived from the smelting of a previous sulfite cooking operation. This liquor is led to a weak cation exchange column 2, in which the resin has been placed in the hydrogen form and the resin voids have been filled with water. The liquor passes up through the resin bed and is led to a strong cation exchange column 3. In both cases, the rate of flow of liquor is such as to cause fluidization of the resins in the columns. The

Keeps Moisture Content Within 1/2 of 1%



Stickle system automatically maintains exact moisture content desired . . . restores proper moisture content after breaks up to 8 times faster

● The Stickle Pres-Ten-Trol system automatically maintains the exact moisture content desired within ½ of 1%, regardless of normal variations in machine speed.

It provides instant regulation of steam flow to the dryers with minimum fluctuation in accordance with moisture content of the sheet passing over the dryers . . . maintains any steam pressure desired when paper is off the machine for start-up, wash-up, or wet end break.

The system records or indicates moisture variation of the sheet, steam pressure in the dryers, and time and duration of wet end breaks. All controls and indicating instruments are grouped conveniently in one instrument panel. There are no hydraulic pistons, chains, pulleys or weights.

The Pres-Ten-Trol restores proper moisture content after breaks up to 8 times faster than other methods . . . eliminates guesswork and manual control of steam flow to the dryers . . . lowers steam consumption . . . records moisture content more accurately than more expensive and more complicated equipment . . . reduces customer complaints.

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Moisture Control Systems
Dryer Drainage Systems
Feed Water Heaters
Vacuum Pumps
Micro Adjustable Orifices
Differential Control Valves

Stickle Equipment
Cuts the cost of steam

Specialists in Reducing the Cost of Steam—Since 1905

A reputation for leadership

Skill and experience have earned APPLETON MACHINE COMPANY the reputation for *leadership* with the pulp and paper industry. That's why APPLETON was chosen to build this 16 roll, 84" supercalender that sets the pace for glassine production efficiency.

This high-pressure glassine stack combines functional beauty with rugged strength and advanced mechanical design . . . and like all other APPLETON products, it was *custom-built* for the specific job and installation.

Let an APPLETON representative help *you!* He has an unmatched record of problem-solving.

APPLETON MACHINE COMPANY

APPLETON, WISCONSIN

Flow characteristics are quickly and easily altered by changing the cam in the positioner. Any desired flow pattern can be obtained with an appropriate cam design. The 4-way pilot is built-in, eliminating external tubing and gages.

Air cylinder operators have "O" ring piston construction. The "O" ring is inserted in a non-metallic material on the outer periphery of the piston, assuring maximum seal and longevity.

WHEN CONTROL IS ESSENTIAL...

DeZurik Automatic Control Valves deliver precise metering control on stock, white water and all other process lines.

The orifice of the valve maintains the same diamond shape at all times. Stock cannot hang up and pack, distorting the flow pattern and destroying precise control.

Their extreme sensitivity, their instant response, self-cleaning design and freedom from backlash add up to the most rigid, most accurate control possible.

For detailed information, write

DeZURIK CORPORATION
SARTELL, MINNESOTA

Patent Reviews . . .

hydrogen of the cation exchange resin is placed with sodium from the liquor, and gaseous hydrogen sulfide is evolved. The treated liquor goes to a waste liquor storage tank 4, and the gases to a separate storage tank 5.

The hydrogen sulfide is subsequently led to a burner 6, forming dilute sulfur dioxide gas which is led to an absorber 7, where it is absorbed in water, forming sulfurous acid which is led to a storage tank 10.

When the ion beds become depleted of hydrogen ions, the flow of liquor is cut off. The columns are washed with water from a tank 8, discharging to tank 9. Unabsorbed sodium retained in column 2 is thus absorbed in column 3.

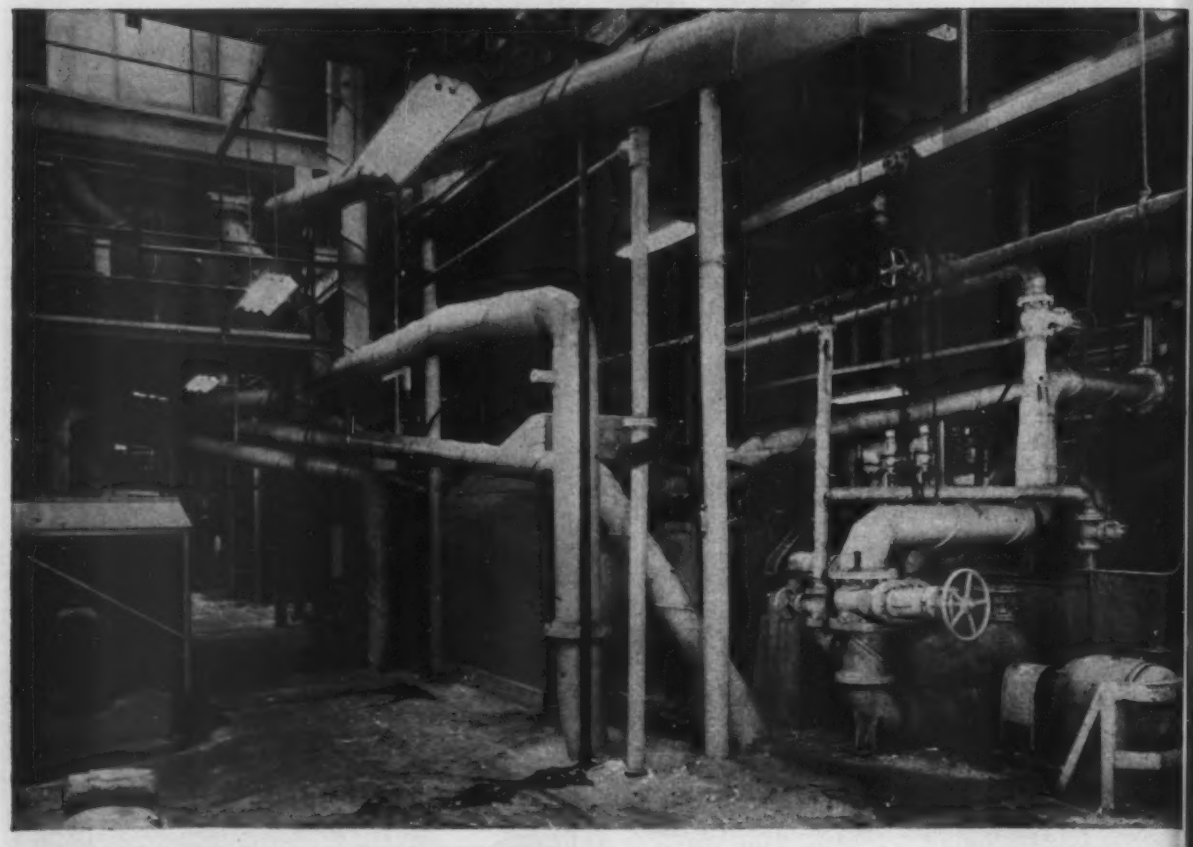
To regenerate the ion exchange resins, sulfurous acid is led from the tank 10 to the column 3, passing down through it and then down through column 2. The effluent from column 2 is suitable for use as a fresh cooking liquor with or without modifications, containing sodium sulfite.

After regeneration, the columns are washed with water from tank 12. Thus, acidity not utilized in column 3 can be used in column 2 to effect further regeneration.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Container manufacture	Herzberg Multne Automatic Products Ltd.	2,775,387	12/25/56
Pouring opening for milk containers	The Bergstein Packaging Trust	2,775,388	"
Container construction	Pennant Corp.	2,775,389	"
Carton	Alford Cartons	2,775,390-1	"
Display carton	William P. Frankenstein	2,775,392	"
Collapsible assembly for box structures	International Can Co. Inc.	2,775,393	"
Composite can with quick-opening side wall	Continental Can Co. Inc.	2,775,394	"
Composite can with quick-opening lap seam	Continental Can Co. Inc.	2,775,395	"
Mailing envelope	Joseph Lindner	2,775,396	"
Manufacture of cellulose	Canadian International Paper Co.	2,775,528	"
Apparatus for the manufacture of hardboard	Coe Mfg. Co.	2,775,787	1/1/57
Manufacture of strips of filter paper for cigarette filters	Ecusta Paper Corp.	2,775,952	"
Cigarette paper	The American Tobacco Co.	2,775,970	"
Paper carton	The Gardner Board & Carton Co.	2,776,081	"
Egg carton	George D. Bennorth	2,776,082	"
Knockdown container	Sam Derman	2,776,083	"
Multi-ply paper bags	Bemis Bro. Bag Co.	2,776,084	"
Process of drum-finishing coated paper	S. D. Warren Co.	2,776,226	"
Waterproof photographic paper	Eastman Kodak Co.	2,776,236	"
Threading device for calender rollers	Herbert W. McAfoos	2,776,605	1/8/57
Mechanism for making containers	General Mills, Inc.	2,776,606-9	"
Cutting and creasing press for the production of box blanks	S&S Corrugated Paper Machinery Co.	2,776,610	"
Apparatus for removing trash from beaters and pulpers	John W. Bolton & Sons, Inc.	2,776,765	"
Apparatus for continuously unwinding web rolls	Black-Clawson Co.	2,776,802	"
Sheet inverting mechanism for us in the manufacture of containers	S&S Corrugated Paper Machinery Co.	2,776,831	"
Method of producing textile cones from a fibrous pulp suspension	Daniel F. Ellnell	2,777,367	1/15/57
Device for applying a strengthening patch to a square-bottom bag	Messers. Fischer & Krecke (Maschinenfabrik)	2,777,368	"
Carton forming and conveying mechanism	Fibreboard Products Inc.	2,777,563	"

PIPE FABRICATION
With Built-in PLUS Performance



No matter what your piping specifications call for, Naylor fabrication service can give you exactly what you need in steel, alloys or stainless.

The extra strength and safety built into the exclusive Naylor Spiralweld structure assures advantages not found in other pipe of the same wall thickness. This PLUS performance is characteristic of Naylor fabrications in any piping layout—simple or complex. By combining pipe and fittings in prefabricated units, extra flanges and connections can be eliminated—to give you economy along with this extra performance.

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NEW PRODUCTS

These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

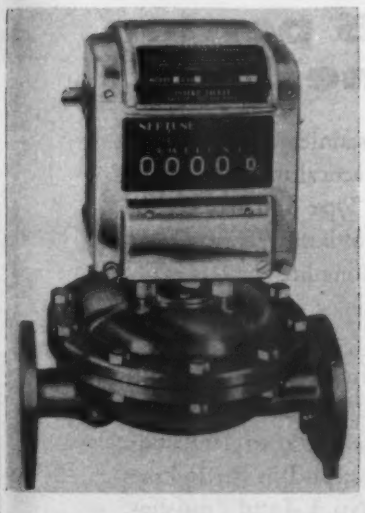
Heavy-duty stationary air compressors

A new series of heavy-duty, stationary air compressors is now available.

The company's AR series ranges from the 2300-lb.-AR-1 model with an output of 330 cfm to the 26,400-lb.-AR-9 model, which delivers 3220 cfm. All compressors in the AR-line are L-type, two-stage, two-cylinder, double-acting water-cooled machines.

Power is supplied either by synchronous or induction-type motors, and all AR compressors are equipped with safety switches which automatically shut them down at predetermined minimum oil pressures and maximum water temperatures. *Atlas Copco Eastern, Inc.*

Circle No. 12 on Readers' Service Card



Stainless steel liquid meter

The meter pictured above makes it possible to obtain close metered control over corrosive solutions and chemicals which must be kept pure. Immune to chemical attack, the meter will maintain its high accuracy over long periods of service in batch mixing and general process work. By measuring the liquids "inside the pipe", it eliminates many of the hazards of handling corrosive liquids.

Capacity of the unit ranges from 20 gpm to 100 gpm for most liquids. *Neptune Meter Co.*

Circle No. 13 on Readers' Service Card

Slitter-rewinder

The machine pictured above was recently put into operation on an embossing line at Brown Co. The machine handles an 87-in. web of from 30-lb. to 100-lb. bleached kraft which is embossed, slit and rewound for use in manufacturing coffee bags.

Good tight rolls are wound on this Model TD, which operates at 1000 fpm when the web is being embossed, slit and rewound. When the embosser is by-passed, the slitter-rewinder operates at 2000 fpm. *Black-Clawson Co.*

Circle No. 11 on Readers' Service Card

Insert flanges

The use of these insert flanges cuts down time on maintenance and repairs to process pipe because no welding is required.

Press fit between insert and flange assures that the pipe or fitting can be expanded into the ferrule permanently and further facilitates usage in that only one piece has to be handled. *Horace T. Potts Co.*

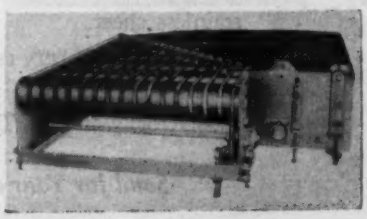
Circle No. 14 on Readers' Service Card

Saran-lined centrifugal pumps

New pumps now being introduced permit the handling of a broad range of corrosive liquids. They are a natural development following the wide acceptance of Saran-lined pipe, valves and fittings.

Two sizes which are available include 1½ in. × 1 in. and 3 in. × 2 in. Both pumps are equipped with seal-cooling systems, and the cooling medium applied may be the fluid being pumped or water from an external source, either of which is channeled back through the pump. *Dow Chemical Co.*

Circle No. 15 on Readers' Service Card



Stewart-Turn for conveyors

The Stewart-Turn is based on a series of narrow belts running in grooved pulleys meeting to provide an angular direction of

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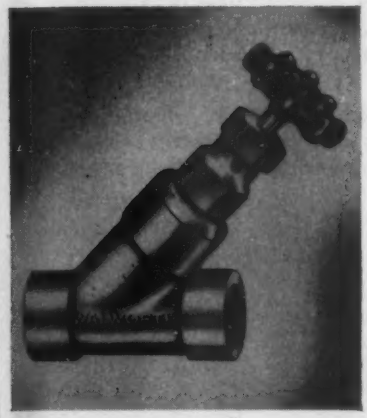
New Products . . .

flow. The belts are banked for constant contact with the material in motion, and positive belt guides prevent side sheer as the material changes direction.

Conveyor systems can go around any degree of corner turn required up to 90°. *Stewart-Glapat Corp.*

Circle No. 16 on Readers' Service Card



All-plastic Y-globe valve

The first all-plastic Y-globe valve with full-flow passage has been introduced to the market.

Made of rigid polyvinyl chloride, the new PVC valve provides tight shutoff and flow control of alkalis, acids, inorganic salt solutions and other corrosive fluids used in paper and allied industries.

At present, the valve is available for 1-in. pipe. Other sizes from ½ in. through 2 in. will be available soon. *Walworth Co.*

Circle No. 17 on Readers' Service Card

Slab chipper

Designed to produce high-quality chips from slabs, edgings and small rounds, soft or hardwood, the slab chipper is equipped with power feed synchronized with the cutting speed to produce uniform, clean-cut chips which are free from bruising.

In the photo above, the horizontal feed spout is shown. This simplifies handling of long slabs and permits "automated" chipping when fed by the same conveyor used to take slabs away from the slab barker.

The capacity of the machine is 3 to 5 cords per hour. *Carthage Machine Co.*

Circle No. 18 on Readers' Service Card

Method for testing heat resistance of polyethylene samples

A new method has been developed to compare heat-resistant qualities of polyethylene samples and indicate the approximate maximum temperatures which a sample will withstand under no-load or minimum stress conditions.

This method is performed by a Vicat softening point kit used in conjunction with an AMINCO heat distortion tester. The test determines the temperature at which an arbitrary needle penetration occurs when specimens are subjected to arbitrary test conditions.

A bulletin is offered by the company explaining the complete details of this method and the instruments. *American Instrument Co. Inc.*

Circle No. 19 on Readers' Service Card

Controller calculator

Here is an automatic calculating device for all commercial and technical calculations.

The instrument can be used for multiplication, division, cost of merchandise, fuel consumption, speeds, areas, volumes and every other type of calculation except addition and subtraction.

Made from all-metal aluminum, the instrument will not wear, break or rust. A case is supplied with the unit for easy carrying. The weight is one ounce and is three inches in diameter.

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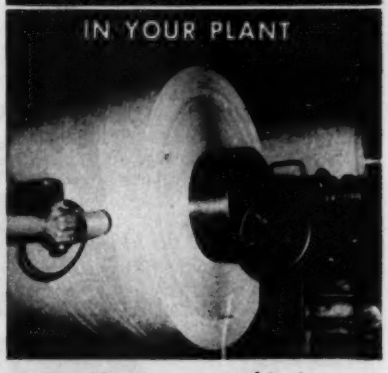

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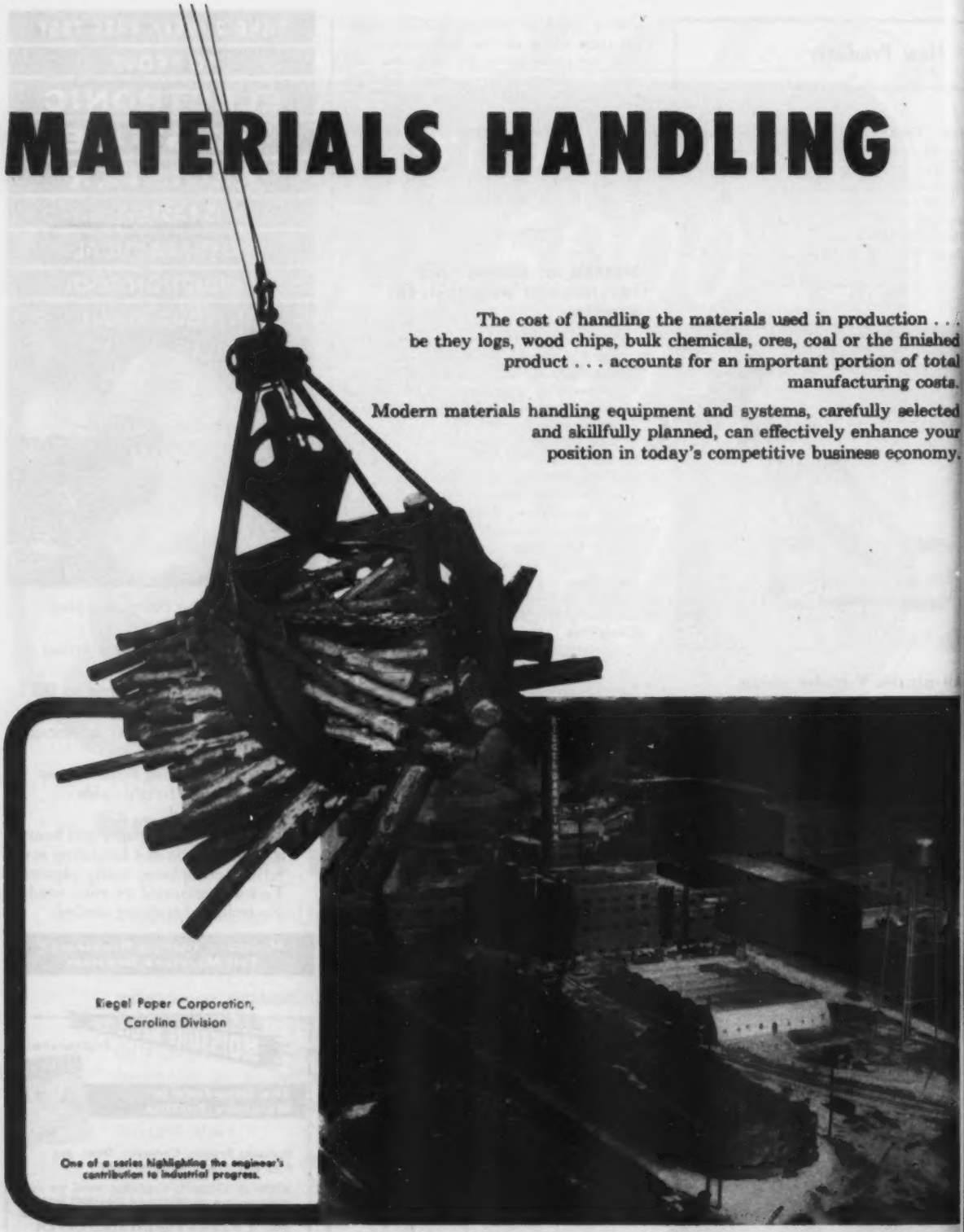

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supplied with the instrument. Cost is $7.95. The unit should prove very satisfactory for all departments in the mill. *Silver Bells Ltd.*
Circle No. 20 on Readers' Service Card

Relief-type lubrication

This new relief-type lubrication fitting is now available for use on anti-friction bearings in motors, machinery, pillow-blocks or any ball or roller bearing housing equipped with conventional relief plugs.

Although the cap is held tightly in place by spring tension, it snaps open or shut with the flip of a finger *Keystone Lubricating Co.*
Circle No. 21 on Readers' Service Card

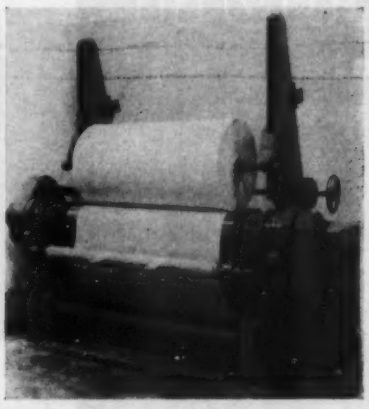
Slide rules

Albany Felt Co. is offering free of charge a slide rule for calculations relating to rolls of paper.

The factors covered by the rule are caliper of sheet, basis weight of sheet, roll diameter, roll weight, roll width and length of sheet in the roll.

The calculator is made of durable acetate, with operating instructions printed on the reverse side.

Another type offered is used to calculate paper machine production. *Albany Felt Co.*
Circle No. 22 on Readers' Service Card

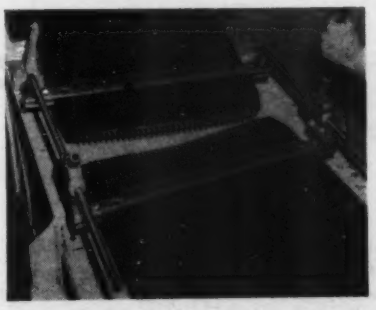


Double drum winder

The picture above shows a new double drum winder which provides a flying transfer at speeds up to 1,000 fpm.

The new winder completely eliminates the changeover problem that has existed with the use of double drum units. Transfer is made at full machine speeds between the front winding drum and a third drum.

"Double drum winding" of the newly-started roll takes place while the finished roll is being removed from the machine. The newly-started roll is then rotated into the main winding position. *Frank W. Egan & Co.*
Circle No. 23 on Readers' Service Card



Belt clamps

The equipment pictured above is known as Far-Pul. The manufacturer states that it is a fast, easy way of installing conveyor belts. It is light in weight and employs fast-acting jacks in place of take-up screws.

Each end of the belt is clamped between bars, one set of which is equipped with jacks and tensioning rods as shown in the illustration. The tensioning rods are slipped over studs on the opposite bar clamp. The ends of the belt are drawn together by the jacks. When fasteners mesh properly, pin is inserted through loops of lacing or fasteners. Tension on jacks is released, clamps are removed from belt and belt is ready to operate. *Flexible Steel Lacing Co.*
Circle No. 24 on Readers' Service Card

D-C motors and generators

A new line of d-c industrial motors and generators known as the Life-Line "H" series has been designed to be equally effective as basic prime movers or as elements of highly complex automatic production systems.

The new motors and generators have drip-proof enclosures as standard and bear NEMA Class B ratings; they span motor ratings from 1 to 150 hp and generator ratings from ¾ to 100 kilowatts. *Westinghouse Electric Corp.*
Circle No. 25 on Readers' Service Card

Electro-pneumatic positioner

Known as Model "E", the electro-pneumatic positioner provides valve positioning which is directly proportional to dc signals received from electronic instruments.

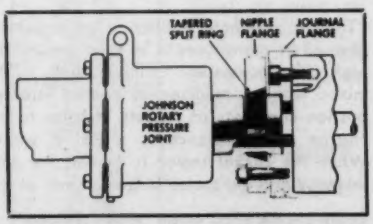
No electro-pneumatic transducer is required; full 100-psi plant air supply can be used.

The unit is designed for the Conoflow LB control valves. *Conoflow Corp.*
Circle No. 26 on Readers' Service Card

Power saw

This new version of the gasoline-powered, reciprocating blade action saw has been given the name of Wright Rebel.

The front assembly has been redesigned to operate at top efficiency even in sandy soil areas. The saw weighs less than 25 lb. and has a 20-in. blade. *Thomas Industries Inc.*
Circle No. 27 on Readers' Service Card



Quick release nipple for use on rotary pressure joints

The drawing above shows the new nipple designed for use with the Johnson rotary pressure joints which are used on paper machines.

This new quick release nipple, also known as the "Q" nipple, greatly simplifies the task of connecting joints to journals on the machine.

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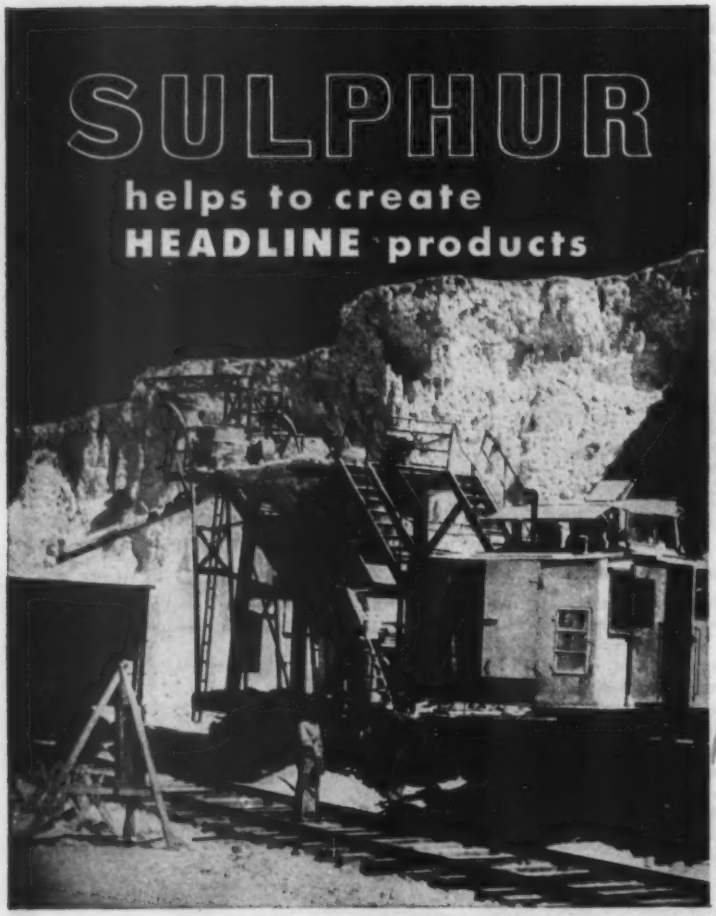

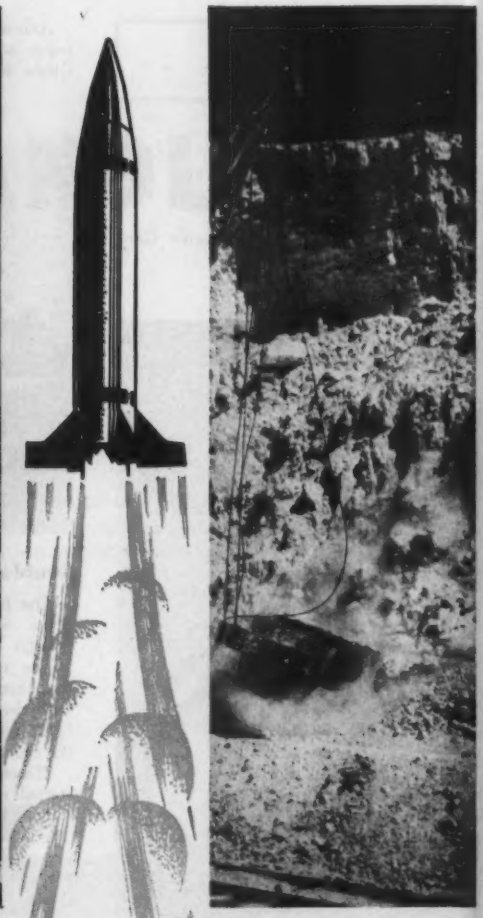

Thiokol®

"Thiokol" synthetic rubber, is an organic polysulfide elastomer. One of its many uses is in solid propellents for long range and high altitude missiles. In liquid form, "Thiokol" synthetic rubber mixed with an oxidizer, is poured into specially designed combustion chambers of rockets. It helps to give stability to the fuel charge and resistance to shock. It promotes uniform burning. When the rocket motor is ignited the mixture burns with great intensity and generates large volumes of gas to propel the rocket.

Solid propellents made with "Thiokol" synthetic rubber have proved their value in rockets over liquid propellents in many ways: they are less costly and easier to manufacture—simple and rugged construction makes handling and launching easier and safer—fuel tanks and complicated feed systems are eliminated.

"Thiokol" synthetic rubber is a product containing a high percentage of Sulphur—its name being derived from the Greek words for sulphur and glue. Here is another example of the continually broadening field in which Sulphur is an important and necessary element.

**A trade name of Thiokol Chemical Corporation.*

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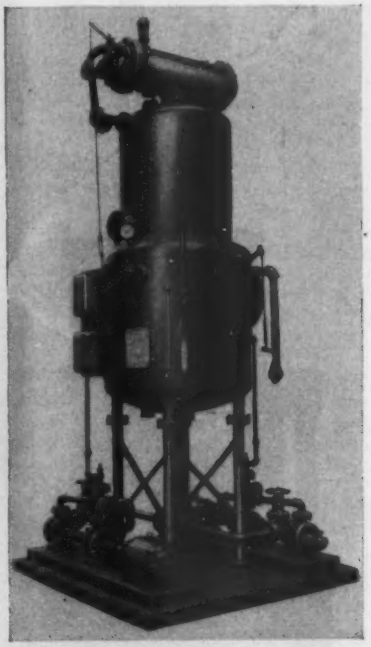
New Products . . .

The "Q" consists of three parts—a journal flange, a tapered split ring and a nipple flange.

As shown in the drawing, the journal flange is fastened to the journal with counter-sunk cap screws. It has a recess into which the nipple fits and treaded studs on which the nipple flange is fastened. *Johnson Corp.*

Circle No. 28 on Readers' Service Card



Feedwater heater unit

A packaged unit including boiler feed pumps and elevated heater mounted on a single base and ready to hook up is now available.

The unit is designed to provide complete automatic boiler feedwater control, supplying boilers with preheated, non-corrosive feedwater as required.

Installation requires no engineering, and hookup consists only of connecting three lines — feedwater inlet, steam inlet and outlet for feedwater to the boiler.

A bulletin is offered which gives further technical details of the unit. *Stickle Steam Specialties Co.*

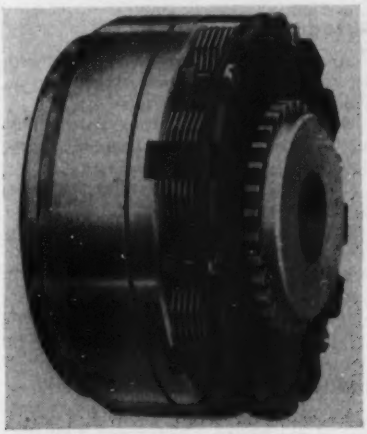
Circle No. 29 on Readers' Service Card

Spray nozzles

New spray nozzles called "Hollowjet", now on the market, offer an unusually wide range of capacities from 1.5 gpm to 1100 gpm, all with a relatively small diameter spray pattern.

At 40-lb. pressure these nozzles produce a spray with a 30° spray angle. The nozzles are made in pipe connection sizes from ¼-in. to 3-in. in brass, steel and stainless steel. *Spraying Systems Co.*

Circle No. 30 on Readers' Service Card

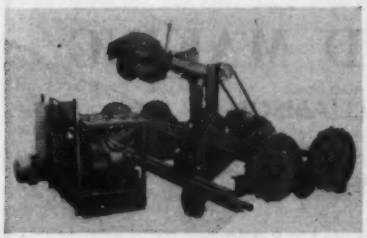


Magnetic clutch

Design features of the new magnetic clutch pictured above include comparatively short axial, small radial dimensions, complete isolation of the magnetic assembly from the integral mechanical parts and compact precision assembly of all component parts. It is furnished in stationary field or brush types and for either wet or dry operation.

The units range in size from 2 to 13 in. for wet or dry operation. *Fawick Corp.*

Circle No. 31 on Readers' Service Card



Log barker

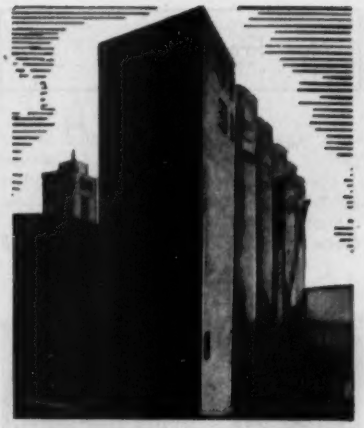
Pictured above is the Eaton log barker. The chain-flail-type unit has many outstanding features such as: its low installation and maintenance cost, heavy construction, attractive output and one-man operation.

The machine debarks logs of from 5 in. to 4 ft. in diameter and can debark as much as 30,000 bd ft. of logs (66 cords) in an 8-hr. period. *White River Machine Co.*

Circle No. 32 on Readers' Service Card

Aluminum grating

Known as RR or rectangular-riveted aluminum grating, this grating was especially designed to retain the combined advantages of a rectangular opening and riveted gratings. It remains structurally



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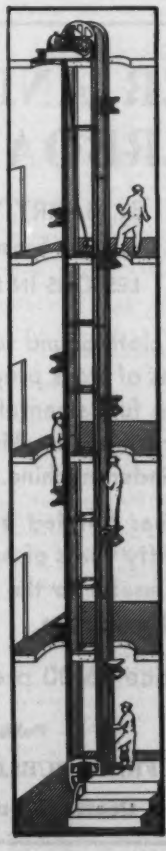

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rigid regardless of cutouts located in any part of the panel.

The grating is easily cleaned and offers greater durability under severe load conditions. *Klemp Metal Grating Corp.*

Circle No. 33 on Readers' Service Card

Single-reduction shaft-mounted speed reducers

Four new 5:1 units have been added to the line of shaft-mounted Shaft-King speed reducers.

These new units provide a speed range from 60 to 350 rpm with the use of fixed or adjustable-speed wedgbelt drives. They will handle loads up to 25 hp. They expand the company's line of drives to handle speeds between 5 and 350 rpm and loads up to 40 hp. *American Pulley Co.*

Circle No. 34 on Readers' Service Card

Rotogravure press

A re-designed drying system has been incorporated in the Rotopackager — an Italian-made rotogravure press.

Because of the new drying system, this machine can now operate at speeds up to 750 fpm.

The machine can be equipped with a folder, sheeter and rewind for multipurpose use and prints up to eight colors. It is available in 24-, 26-, 30- and 32-in. widths. *Parsons & Whittemore Graphic Corp.*

Circle No. 35 on Readers' Service Card

Industrial air compressor

Known as the WN-224, this new heavy-duty industrial air compressor is the largest package-type compressor available according to the manufacturer.

Output at 80-125 psig is rated from 2418 to 6048 cfm, depending on motor horsepower, which ranges from 350 to 1000. The unit may be driven by electric motor, either flange-mounted or coupled, or by diesel engine, steam turbine or turbo-electric combinations. *Joy Mfg. Co.*

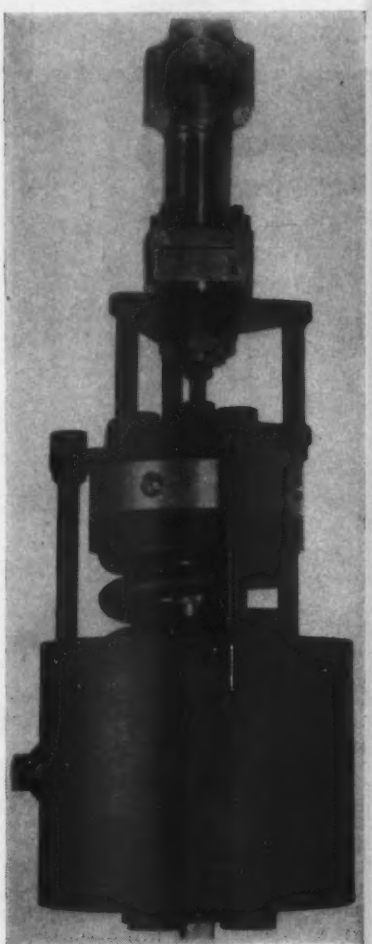
Circle No. 36 on Readers' Service Card

Dust collector

This dust collector is known as the Aerodyne. It is designed to permit maximum efficiency regardless of the size of the installation and the volume of gas handled.

The complete unit occupies little space and may be installed in a horizontal, vertical and even slanting position, which makes it readily adaptable to space available. *Research Cottrell Inc.*

Circle No. 37 on Readers' Service Card



All-metal actuators for control valves

A complete line of all-metal actuators for control valves has been developed for use under difficult conditions such as atomic radiation, high temperatures and corrosion.

For use in highly corrosive atmospheres, one model (pictured above) is manufactured with stainless bellows and stem. Its frame is made from cold rolled steel which has been cadmium plated. It is available in three ranges of signal pressures: 3 to 15 psi, 6 to 30 psi and 9 to 45 psi, possessing a maximum thrust of about 3,000 lb. *Robertshaw-Fulton Controls Co.*

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Books

THE PAPER YEAR BOOK OF 1957. Published by Davidson Publishing Co., 405 East Superior St. Duluth 2, Minn. 572 pages. $10.00.

The new edition represents a complete revision, with the addition of many new products and much new information reflecting the changes that have been made in paper and related products during the past year.

Detailed information on more than 1250 papers, paper products and related items, as well as data on markets, uses, government specifications and other information for both buyers and sellers of paper are also contained in this volume.

Bound in a hard cover, the book is made up in eight sections and thumb-indexed for easy reference.

WOOD PARTICLE BOARD HANDBOOK. Edited by Professor E. S. Johnson. Published by the Industrial Experimental Program at North Carolina State College. 300-page hardback volume. $3.00.

The book describes how wood wastes are formed under pressure into particle board which has an attractive surface suitable for furniture manufacture and other applications.

Details discussed include the manufacturing methods and machinery used in the production of wood particle board. Also included are other major aspects such as forms and types of raw materials used, the marketing of the board and product properties.

MODERN PULP AND PAPER MAKING. By John B. Calkin. Published by Reinhold Publishing Corp. 430 Park Avenue, New York 22, N.Y. 549 pages. $10.00.

A third edition of this book has now been released. This revised edition has been edited by John B. Calkin, industrial consultant.

Twelve chapters have been written by outstanding authorities and cover up-to-date treatment on modern equipment, processes and methods in the industry. Information on economics and general mill design is also included.

This book has always been noted as a valuable reference source and a useful guide for those who wish to obtain a broad knowledge of the pulp and paper industry.

TEXTBOOK OF POLYMER CHEMISTRY. By Dr. Fred W. Billmeyer Jr. Published by Interscience Publishers Inc., 250 Fifth Ave., New York 1, N.Y. 526 pages. $10.50.

The physical chemistry as well as the organic chemistry of polymers is the subject of this textbook. It covers the preparation and properties of plastics, fibers and elastomers and is up to date through the major advances made in 1956.

The book has been written with textbook treatment specifically for first year graduate courses and for practicing chemists for review or self-study.

USDA Reports

NEW OR REVISED PUBLICATIONS. Here are four new or revised publications which have just been issued by the U. S. Forest Products Laboratory and are available without charge: "Recycling Liquor Systems for Cold Soda Pulping," Report No. 2059; "Neutral Sulfite Corrugating Boards from Southern Red, Scarlet, and Black Oaks," Report No. 2067; "Developments in Debarking," Report No. 2071; and "Pollution of Streams from Pulp and Paper Mills," Report No. 1207. Copies of these reports may be obtained by writing the Director, U. S. Forest Products Laboratory, Madison 5, Wis.

ATTACK ON THE GYPSY MOTH. Picture Story No. 103 dated April, 1957 is a four-page bulletin with photos and descriptions on fight against the gypsy moth. There is another release dated March 30, No. USDA 858-57, which is a seven-page paper giving more details about the 1957 aerial spraying program and other background information. Both releases can be obtained by writing to: Office of Information, Department of Agriculture, Washington 25, D.C.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Laboratory Glassware Catalog. Kern Laboratory Supply Co. Two newly imported lines of fine West German laboratory glassware are highlighted in a new inclusive catalog issued by the company. Complete selection is given in each line, along with announced prices.
Circle No. 39 on Readers' Service Card

Antifoam P-3. Hodag Chemical Corp. An information sheet is available on this antifoam for paint, adhesives, paper, and chemical processing. Properties, applications, service and shipping data are all given on the data sheet.
Circle No. 40 on Readers' Service Card

Pulp and Papermaking Machinery. Sandy Hill Iron & Brass Works. This is a catalog presenting the complete line of pulp and papermaking machinery designed and manufactured by the company.
Circle No. 41 on Readers' Service Card

Products of Black-Clawson. Black-Clawson Co. A 23-page booklet gives photos and description of the company's line of machines for the paper industry. Also is a listing of bulletins and data sheets which give more technical details covering the products is given.
Circle No. 42 on Readers' Service Card

Web Length and Winding HP Calculator. Black-Clawson Co. Inc. This calculator will enable you to determine, in seconds, the web length of any size roll. On the other side, you will find the hp needed to slit or rewind this roll. This is a helpful tool and can be sent to you free of charge.
Circle No. 43 on Readers' Service Card

Wall Chart of Conversion Factors. Precision Equipment Co. This reference table is ideal for engineers and others for use in speeding up the location of factors we use daily, but which seem to slip our minds. Included are common conversions such as inches to centimeters, watts to H.P., cu. ft. to liters etc.
Circle No. 44 on Readers' Service Card

Underground Pipe Conduit. Porter-Hayden Companies. This 12-page publication covers all of the essentials pertaining to underground pipe conduit. It shows how Thermo-O-Tile is constructed and installed. The bulletin gives pictured-examples of applications.
Circle No. 45 on Readers' Service Card

Continuous Roll Stands. Charles R. Stevens Inc. The Stevens continuous roll stand which is now available is described in this illustrated, 4-page bulletin. Diagrams of installation and other data are completely covered in this bulletin.
Circle No. 46 on Readers' Service Card

Non-ionic Surface-active Agent. Arnold, Hoffman & Co. Inc. Lubtol WX, a non-ionic surface-active agent, is detailed in a new technical bulletin recently released by the company. The bulletin covers the agent's applications.
Circle No. 47 on Readers' Service Card

Electric-powered Fork Truck. Elwell-Parker Electric Co. A 3000-lb. capacity, electric-powered fork truck is described and illustrated in a 4-page bulletin. The model was designed where low headroom is a problem.
Circle No. 48 on Readers' Service Card

Permaglas Smokestacks. A. O. Smith, Smith Corp. The company's answer to industry's fight against corrosive flue gases is revealed in a new bulletin discussing glass-protected steel smokestacks. The 8-page bulletin describes how the smokestacks provide longer life and lower costs.
Circle No. 49 on Readers' Service Card

Groundwood-type Pulp from Chips. Bauer Bros. Co. Eleven pages are devoted in describing the Bauerite process—a new method developed by the company for producing

New Literature . . .

groundwood—type pulp from hardwood chips. The booklet is a reprint of an article, giving photos and diagramatical drawings of the process.
Circle No. 50 on Readers' Service Card

Liquid Defoamers for Aqueous Systems. Air Reduction Co. New liquid defoamers called Surfynol 104A and 104E have shown excellent results in paper coatings. A bulletin is offered describing the defoamers—their properties, uses and results.
Circle No. 51 on Readers' Service Card

Modern Elevated Water Tanks. Chicago Bridge & Iron Co. This 16-page brochure describes two types of water storage tanks which are products of the company.
Circle No. 52 on Readers' Service Card

Products and Processes. Infilco Inc. A 32-page bulletin dealing with all water and waste treatment equipment designed and manufactured by the company.
Circle No. 53 on Readers' Service Card

Belt Conveyor Idlers. Chain Belt Co. Bulletin 56-80 is a 60-page booklet showing and describing with photos, charts etc., the company's complete line of belt conveyor idlers and related products.
Circle No. 54 on Readers' Service Card

Automatic Brake Device for Lift Trucks. Fluid Control Co. A brochure describing a new braking device for use on fork lift trucks. The company states that it has been found very satisfactory. A schematic drawing is also included to give a more clear understanding of the device.
Circle No. 55 on Readers' Service Card

Brightening Agent. Sandoz Chemical Works Inc. Higher Whites at Lower Costs is the title given to the leaflet describing a formula now being offered, which gives more brilliant whites on bleached papers. The leaflet is also printed on high-whiteness paper.
Circle No. 56 on Readers' Service Card

Mechanical Packings. Flexrock Co. A new 4-page folder lists mechanical packings used on all applications in industrial, power and processing plants. Photos and descriptions are also given for each product.
Circle No. 57 on Readers' Service Card

Starches for the Paper Industry. A. E. Staley Mfg Co. A new 4-page technical data sheet describes the use of oxidized starches in paper and gives physical and chemical data on oxidized starches offered. This product is known as Stayco.
Circle No. 58 on Readers' Service Card

Improving Human Relations. National Association of Manufacturers. This booklet presents an action program which is designed to help top management develop better supervisor-employee relations in the plant.
Circle No. 59 on Readers' Service Card

Rotary Feeders for Material Handling Systems. Allen-Sherman-Hoff Co. Six pages of descriptions and photos are given to describe the company's Type B rotary feeder for heavy-duty material applications. Tables for the selection of sizes and capacities are also included.
Circle No. 60 on Readers' Service Card

Strapping Tape. Johns-Manville. An 8-page illustrated booklet describes the uses and advantages of a new 250 lb., tensile-strength strapping tape developed by the company. The booklet is complete with technical data, performance specifications and descriptive text.
Circle No. 61 on Readers' Service Card

Hiring Manuals for the Job-Tests. Industrial Psychology Inc. The publication of a new and simplified program for hiring employees is explained in the hiring manuals for the job-tests and three hiring manuals. A free sample of one of the hiring manuals, including specimen bulletins and test forms, is available.
Circle No. 62 on Readers' Service Card

Technical Glassware Catalog. Kontes Glass Co. The company has published a 234-page catalog containing prices on 11,130 items of laboratory and scientific glassware.
Circle No. 63 on Readers' Service Card

Protective Linings and Coatings. Metalweld Inc. The company offers a brochure discussing types of portective linings and coatings, why they are important, when and how they should be applied and advice on maintenance.
Circle No. 64 on Readers' Service Card

Filter Leaves. Multi-Metal Wire Cloth Co. Inc. "Importance of Properly Designed Filter Leaves" is the title of this issue of the company's house organ. It discusses the care and selection of proper filter leaves.
Circle No. 65 on Readers' Service Card

Logging Movies. R. G. LeTourneau Inc. Two movies, both filmed at logging camps and mills in the Pacific Northwest, are made available for free showings. The first film, "Giant in the Yard", runs 27 min. and shows electric log stackers working under adverse conditions in four mill yards. The second film, "The Big Skidder", runs 20 min. and shows electric logging arches at work on three shows. Both movies are in sound with discussions of logging problems.
Circle No. 66 on Readers' Service Card

Self-Adhesive Pipe Marking Materials. Printed Cellophane Tape Co. Over 500 self-adhesive vinyl plastic pipe markers carried in stock, which conform to accepted standards, are listed in a catalog offered by the company.
Circle No. 67 on Readers' Service Card

A New Approach in Public Relations Programs for the Pulp and Paper Industry. L. A. Whitney Associates Inc. This new approach provides a flexible tool to aid your management representatives in telling the story of your industry and your company in a manner which will hold attention and stimulate interest. Particularly suited for presentation on various projects.
Circle No. 68 on Readers' Service Card

How to Select a Fire Extinguisher Chart. Fire Equipment Manufacturers' Association Inc. A new chart is available free of charge from the company. The chart lists basic types of extinguishers and shows at a glance which to use against the three classes of fire. How the various extinguishing agents kill fire and other information on extinguishers are included on the chart.
Circle No. 69 on Readers' Service Card

Anionic Surfactants. General Aniline & Film Corp. The company has published a brochure on two chemicals—Blancol and Blancol N. Both products have excellent thinning, dispersing and dye leveling action and have found acceptance in the paper industry as anionic surfactants. The brochure tells of other uses for the paper industry.
Circle No. 70 on Readers' Service Card

Industrial Batteries. Gould-National Batteries Inc. "So You're Going to Buy an Industrial Battery" is the title of a 16-page illustrated reference booklet just released by the company. The pocket size booklet is designed to help buyers select the most economical and efficient battery for their operation.
Circle No. 71 on Readers' Service Card

Emulsions in Paper Coatings. Rohm & Haas Co. The company has prepared a 16-page booklet giving technical description of the Rhoplex Acrylic emulsions used in paper coatings. Charts and tables are also given in the booklet.
Circle No. 72 on Readers' Service Card

PAPER CONDITIONING

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3 Combustion Engineering Company 500 H.P. Automatic Spreader Type Stoker Fired Boilers — one new in 1947, two in 1946. Type VMH Furnace width at Boiler 14', heat surface 5,880 square feet.

476 Tubes 3¼" Diameter x .120. Size 14'-28-3-¼", VMH 13-36, 36, 48-17'. Design Pressure 201-Pounds, built to A.S.M.E. Rules. Contract No. 35846-BV and 22246-BV. Serial Nos. 3434, 3316, 3314. 2 Boilers equipped with Combustion Engineering Company Automatic Spreader Stokers, 1 with American Engineering Company Automatic Spreader Stoker. Two with Steam Turbine driven forced Draft Fans, one with Motorized Fan. Each with Proportioneer Adjust-O-Feeder Pump, Hays Recording Meters and Controls.

These Boilers are completely dismantled and will be sold in a group or singly, as customers may desire. The boilers and equipment are in very excellent condition and will make a very good buy for anyone who has a use for a 3-Drum Bent Tube Low Head Boiler. Each Boiler is rated at 50,000 lbs. steam per hour. If interested, write direct to Chief Engineer, Groveton Papers Company, Groveton, New Hampshire.

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Graduate Industrial Engineer with practical experience in the paper industry. A knowledge of paper finishing is desirable. Should have ability in organization, expansion, mechanization and labor relations. Under 38 years of age, good salary and benefits. Fine opportunity for a man who is energetic and desires a challenge. Send detailed resume of experience and education to Personnel Manager, West Virginia Pulp and Paper Co., Luke, Maryland.

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1—4'x10' surface type F300 Tyler Ty Rock Screen, complete with 1—7½ HP motor with base, 1—7½ HP V-belt drive, and 1—set of drive and fly wheel guards.

Practically new. In excellent condition. Can even be used as gravel sifter. Inspect at any time upon notice to Purchasing Agent. Best offer will be entertained. Address reply to: Peter J. Schweitzer, Inc., Spotswood, New Jersey.

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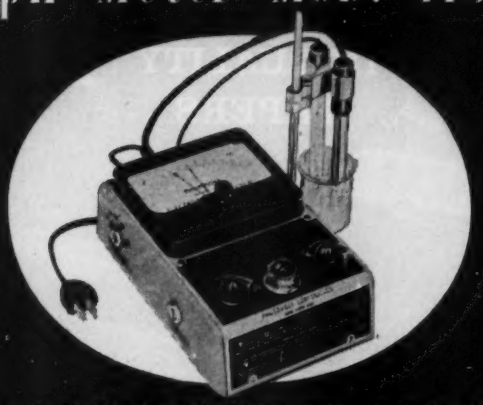

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A "must" for surface sizing of high grade bond and ledger papers say users of improved Hercules Brand Starches. But Hercules Starches, made under 100% automatic control by an exclusive new process, are produced in a wide range of fluidities for many other paper making applications.

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MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.
No. 1 white shirt cuttings	13.00— 13.50
Soft unbleached muslins	15.50— 16.00
Fancy shirt cuttings	4.50— 5.00
No. 1 percales	5.50— 6.00
No. 1 washables	2.25— 2.50
No. 1 light silesias	6.50— 7.00
No. 1 light prints	4.75— 5.00
Light flannelettes	6.50— 7.00
Cottonades	2.75— 3.25
Blue overall cuttings	6.75— 7.25
Blue cheviots	6.75— 7.25
Canton flannels, bleached	10.50— 11.00
Canton flannels, unbleached	10.50— 11.00
Osnaburg cuttings	9.50— 10.50
Underwear cuts, bleached	14.50— 15.00
Underwear cuts, unbleached	14.50— 15.00
Sun tan khaki cuttings	5.00— 5.50
American linen cuttings	6.75— 7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.
No. 1 roofing (Chicago)	.90— .95
No. 2 roofing (Chicago)	.60— .65
Twos and blues, repacked	1.50— 1.75
Thirds and blues, repacked	1.50— 1.75
No. 1 whites, repacked	—
No. 1 whites, miscellaneous	—
No. 2 whites, repacked	—
No. 2 whites, miscellaneous	—

RAGS (Foreign)

(ex dock New York City)

New Rags

	per cwt.
New dark cuttings	Nominal
New mixed cuttings	
New light silesias	
Light flannelettes	
Unbleached cuttings	
New white cuttings	
New light oxfords	
New light prints	

Old Rags

	per cwt.
No. 1 white linens	Nominal
No. 2 white linens	
No. 3 white linens	
No. 4 white linens	
No. 1 white cottons	
No. 2 white cottons	
No. 3 white cottons	
No. 4 white cottons	
Extra light prints	
Ordinary light prints	
Medium light prints	
Dutch blue cottons	
French blue cottons	
French blue linens	
Checks and blues	
Linsey garments	
Dark cottons	
Old shopperies	

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	5.50— 6.00
Gunny No. 1, foreign	5.50— 6.00
No. 1 manila rope, domestic	7.75— 8.25
No. 1 manila rope, foreign	6.25— 6.50
New burlap cuts (soft)	6.00— 6.50
Sisal strings	4.25— 4.50
Mixed strings	1.50— 1.75

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	105.00—115.00
No. 1 hard white shavings	85.00— 90.00
No. 1 soft white shavings	50.00— 55.00
Soft white shavings, uncoated	55.00— 65.00
Fly leaf shavings No. 1	25.00— 30.00
Fly leaf, woody, No. 1	30.00— 35.00
Mixed colored shavings	18.00— 20.00
No. 1 books and magazines	15.00— 16.00
Ledger stock, white, No. 1 (carloads)	45.00— 50.00
Ledger stock, colored, No. 1 (Midwest ship)	25.00— 27.00
New manila envelope cuttings (free of groundwood)	60.00— 65.00
New manila envelope cuttings (containing groundwood)	50.00— 55.00
Manila tab cards	60.00— 65.00
Colored tab cards	45.00— 50.00
New all-kraft envelope cuttings	60.00— 70.00
Triple sorted kraft, 100%	25.00— 30.00
No. 1 old kraft	25.00—
White news cuts, No. 1	50.00— 55.00
No. 1 overissue news	16.00— 17.00
Folded news, special	14.00— 15.00
Folded news, ordinary	11.00— 12.00
Old corrugated boxes	14.00— 15.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	9.00— 11.00
Boxboard cuttings	6.00— 7.00
No. 1 mixed paper	3.00— 4.00

CHEMICALS

F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt	5.05—
Powdered, drums, works, cwt	5.20—
1-Arginine, drums, kilo	74.80—
Blanc Fixe	
Direct process, bags, c.l., works, ton	110.00—
L. c. l., works, ton	120.00—
Bleaching Powder, drums, cwt	
Casein, domestic acid precipitated	
Standard, bags, 10,000-lb. lots or more, shipping point, lb	No Prices
Premium, bags, 10,000-lb. lots or more, shipping point, lb	No Prices
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh, bags, c. l., Georgia works, ton	10.00—
300-mesh, bags, c. l., Georgia works, ton	13.50— 14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00— 35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt	3.15—
Glycerine, refined (CP, USP) 99%, drums, c. l., delivered lb.	.29½—
Litharge, commercial powdered	
Barrels, c. l., works, freight equalled, lb.	.17¾— .18
Rosin, gum, c. l., f.o.b. New York, cwt	
E	8.90—
F	8.90—
G	8.90—
WW	10.30—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M	8.00—
N	8.10—
WG	8.60—
WW	8.90—
Saltcake, domestic, bulk Works, 100% Na_2SO_4 basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c. l. works, cwt	1.85—
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt.	4.70—
Solid, 76%, drums, c. l. works, cwt.	4.30—
Sodium Silicate	
40°Be, 1:3, 2, turbid, drums, c. l., works, cwt.	1.55—
52°Be, turbid, 1:2, 4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	7.47—
Pearl, 100-lb. bags, cwt.	7.32—
Powdered, 100-lb. paper bags, cwt.	7.44—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	26.50—
Talc	
Domestic, bags, c. l. works, ton	33.00— 39.50
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Dioxide	
Pigment, calcium-rutile base, regular, bags, c. l., lb.	.09¼—
High-tinting, drums, c. l., lb.	.09 —
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l., freight allowed, lb.	.14½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.15½—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	150.00—
Bleached sulfite, Canadian	150.00—
Unbleached sulfite	130.00—
Unbleached sulfite, Canadian	130.00—
Bleached soda	145.00—
Bleached soda, Canadian	145.00—
Kraft, bleached hardwood	150.00—
Kraft, bleached	152.00—155.00
Kraft, bleached southern	155.00—
Kraft, bleached Canadian	155.00—
Kraft, unbleached southern	117.50—122.50
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	130.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	140.00—
Sulfite screenings	72.50—
Sulfate screenings	67.50—
Groundwood, dom.	82.50— 90.00

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite, Swedish, freight allowed	150.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	150.00—
Bleached sulfite, Finish, freight allowed	150.00—
Unbleached sulfite, Swedish, freight allowed	130.00—
Unbleached sulfite, Finnish, freight allowed	130.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	155.00—
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100.00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manila lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	175.00
.018	177.50
.016	182.50
Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	19.80
No. 2 enamels	18.80
Machine-coated, 45- to 100-lb.	14.75— 18.40
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	16.55
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	15.65
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	63.20
75% "	48.45
50% "	36.95
25% "	31.00
Rag Content Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
100% rag	64.40
75% "	49.60
50% "	38.10
25% "	32.20
Sulfite Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	
No. 1	21.85
No. 2	21.15
No. 4	19.75
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	23.10
No. 2	22.35
No. 4	20.95
Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials
Tissues (carlots)	per ream
White No. 1	
White No. 2	
Bleached anti-tarnish	
Colored	
Anti-tarnish kraft	
Manila	
Napkins, semi-crepe (12½ lb. to M shts) per case	
Napkins, full crepe and embossed (12½ lb. to M shts) per case	
Toilet, bleached (M shts) per case	
Toilet, unbleached (M shts) per case	
Wrappings (kraft, basis 50 lb. and heavier)	per cwt
Standard wrapping	9.25
Butchers, counter rolls	10.25
Standard bagging, mill rolls	
Shipping sack, mill rolls	
Gumming, mill rolls	
Asphalting, mill rolls	
Envelope, mill rolls	

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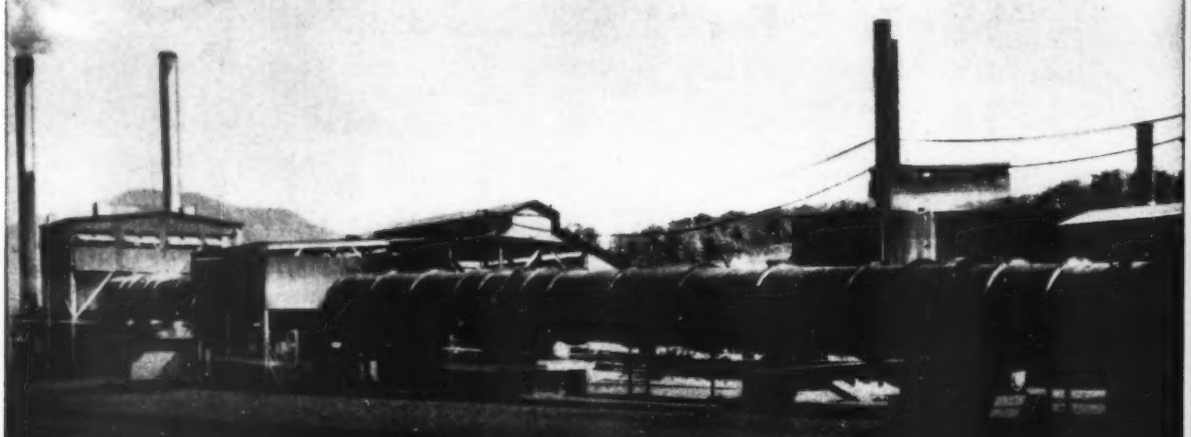
We are specialists in the design and manufacture of rotary kilns, coolers and auxiliary equipment for burning lime, lime sludge and for many other purposes. Over 1,000 Smidth rotary kilns have been furnished all over the world.

Shown below is the second Smidth Rotary Kiln for reburning lime sludge at the Canton, North Carolina, plant of the Champion Paper & Fiber Co.



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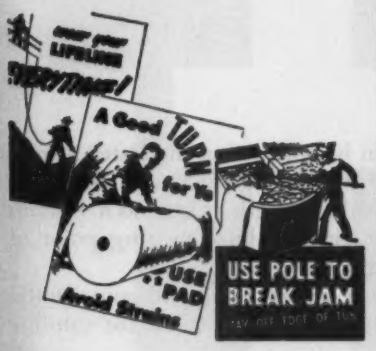
— A POTENT SAFETY TOOL



Posters should be one of the top aids in your safety program. No other safety medium can reach your entire audience—not once, but many times each day—with such low-cost safety messages. They are directed at the worker acts and worker attitudes that lead to accidents. Posters lend *timeliness, repetition and continuity* to your safety program . . . the three fundamental principles of direct selling.

The National Safety Council maintains a stock of posters that covers all industries, operations and phases of safety and health. These posters are produced in three sizes: "A" size, 8½" x 11½"; "B" size, 17x23"; and "C" size, 25x38". Their colorful illustrations and eye-catching captions make them ideal for the mass selling of safety.

Write for a free copy of the Directory of Occupational Safety Posters. This 72 page catalog illustrates 744 posters, indexed and classified for specific operations.

NATIONAL SAFETY COUNCIL

425 N. Michigan Ave.
Chicago 11, Illinois

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PAPER INDUSTRY

Whither?

. . . in production, processes, new products, markets

New synthetic fiber from waste liquor

New polyester fibers, derived from vanillin by converting the latter to protocatechuic acid, are reported by Dr. Louis H. Bock and James K. Anderson of Rayonier Inc. The new fibers show a tensile strength as high as 4.4 grams per denier. They further have the advantage of a high melting point of 419° F, good drying properties and low water absorption.

This discovery is bound to create new interest in synthetic vanillin production from lignin, as it may open new and large markets for vanillin.

New insect repellent paper

A light-weight creped wiping tissue treated with an effective insect repellent has been developed by Orchard Paper Co. of St. Louis, Mo. The repel-paper (known as Orcopel repel-paper) is used by merely wiping it on the exposed parts of the body to effect 100 per cent protection up to 4 hrs. against mosquitoes, gnats, chiggers and flies. The paper is said to be non-toxic, non-irritating to the skin, and reusable for as many as eight applications without losing its effectiveness.

New optical device for alignment of equipment

A new axicon developed by Eastman Kodak's Apparatus & Optical Div. permits high-precision alignment of equipment. In one practical application the axicon gave a straight line out as far as 75 ft. Anywhere along this 75-ft. range the line can be located to better than .0005 in.

The instrument has already proved itself in lining up large steam turbines for power plants with far greater precision than was previously possible. It is believed that the new axicon could be used to advantage in drying rolls and drive shaft alignment in paper mills.

Forest inventory by aerial photography

Forest inventory methods by aerial photography have been perfected to such a degree that foresters are able to study the photos through a device that gives valleys, hills and trees a three-dimensional perspective. Heights of trees can be compared, species identified, the amount of mature timber determined and the acreage determined within an accuracy of 0.25 per cent.

The forest products industry

The national lumber industry consists of 55,000 manufacturing units and produces annually 40,000,000 bd. ft. lumber. The lumber is marketed by 12,000 wholesale distributors and 26,000 retailers.

The pulp and paper industry, with 804 mills manufacturing paper and paperboard and 330 mills manufacturing pulp, produces 31,500,000 tons of paper and board and 22,200,000 tons of pulp annually. The pulp and paper manufacturing industry represents an investment in property of some $7,800,000,000.

you are making
a filled sheet—and

you would like to increase
the ash content, opacity
or brightness of your
finished paper without
increasing your usage
of fillers—or

you want to maintain
your present standards
while reducing usage
of clay and pigment—

THEN • • • we suggest you investigate the use of DARLING'S IMPROVED BONE GLUE as a wet end additive.

We've learned that every paper mill, including your own, is "different." That's why a cooperative mill trial is the best way to get a technical and economic evaluation.

Our Technical Service Representative would like to work with you in determining what can be accomplished in your mill. The cost of the glue and technical service are on us, so you've nothing to lose—much to gain. Arrangements can be made through your Darling Sales Representative. Or write, call, or wire us direct.

DARLING & COMPANY
GLUE DIVISION
4201 South Ashland Avenue • Chicago 9, Illinois

DARLING'S improved BONE GLUE

PULP

Perkins-Goodwin Co.

Established 1846

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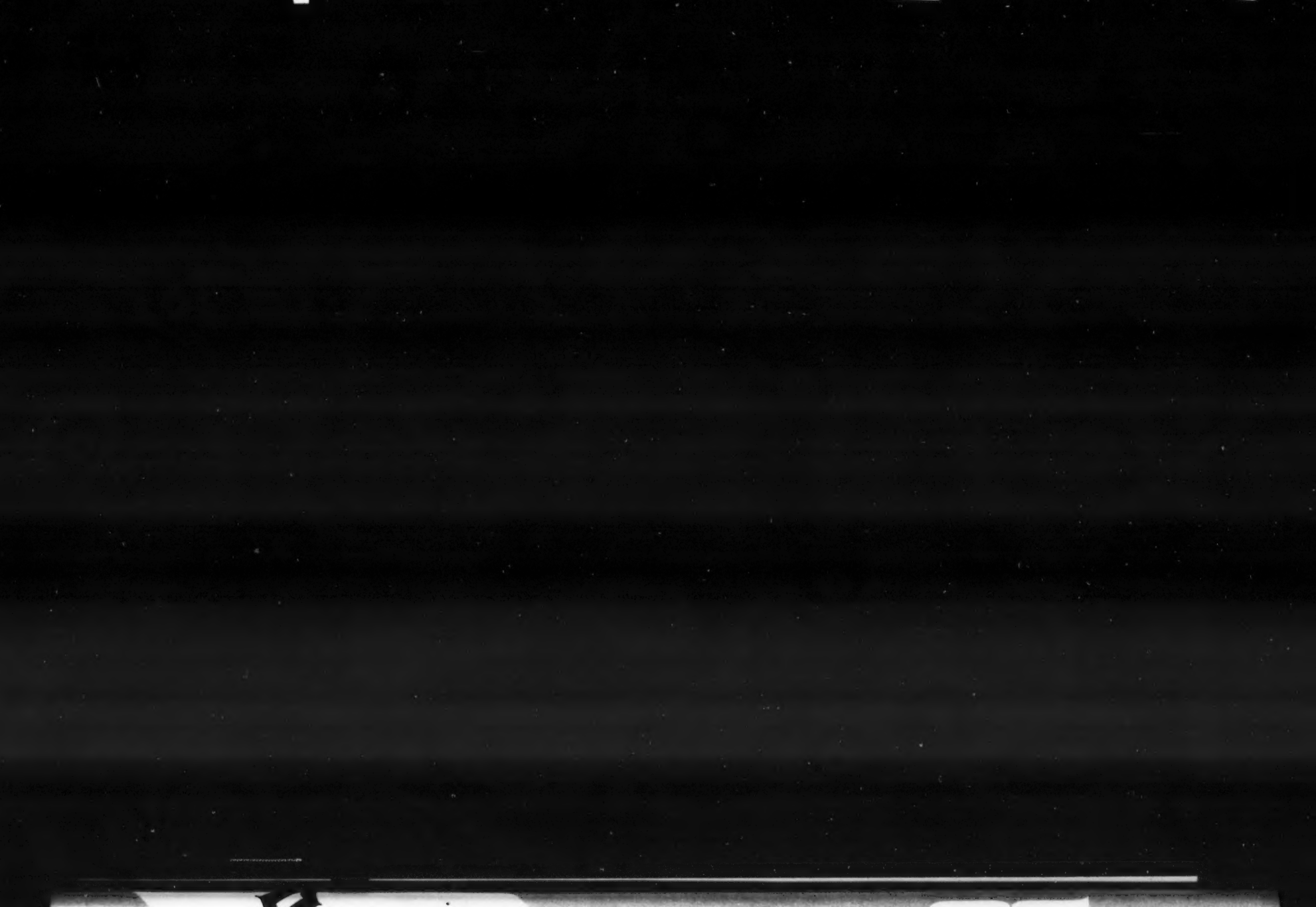
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